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Local and International Policies for Rebuilding Beirut Urban Port

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Finally, I can't help but emphasize the reason for my research topic, the anguish that Lebanese civilians have lived and experienced on August 4th, 2020, as well as all the victims of this explosion.

***Abstract*:**

On August 4, 2020, a massive amount of ammonium nitrate held at Beirut's port exploded, killing at least 200 people, injuring over 7,000 others, causing US$3.8-4.6 billion in material damage, and displacing over 300,000 people. Lebanon was already in the midst of a fast-worsening financial crisis, which was made worse by the onset of COVID-19. The explosion brought to light the city of Beirut's instability and diverse development strategy. This research paper examines the social, economic, and urban impacts of the explosion on Beirut, with an emphasis on the Beirut Port, which was destroyed, as well as the post-event management and restoration efforts, as well as the essential role of private organizations. In particularly it examines and compares successful examples or frameworks in other cities and similar context cities in history with urban/social disruptions, evaluates current planning initiatives, analyzes the case study of the recent World Bank report on reforming Beirut port, and conducts interviews to provide the divided city of Beirut with a redevelopment and reconstruction geopolitical and local policies for the port of Beirut.

Keywords: Beirut Explosion, Port of Beirut, Private Associations, Urban redevelopment, Post disaster management.

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1. Introduction:

The explosion at the Beirut Port on August 4, 2020, was a watershed moment in Lebanon's and Beirut's history. The silos that held the majority of Beirut's grain stockpiles were destroyed, as were large parts of the Beirut Port and its infrastructure. Several surrounding residential neighborhoods were also damaged by the bomb, as were five significant hospitals. Most government buildings were also damaged. It was a disaster that hit the Medawar, Karantina, AlBadawi, Mar Mikhael, Rmeil, Gemayzeh, and St. Nicolas neighborhoods, as well as Burj Hammoud, Ashrafieh, Bashoura, and Zuqaq El Blat areas as shown in Figure 1.

It spread to other areas in the city, killing over 200 people and injuring hundreds more; it also destroyed over 6,000 structures, causing entire or partial destruction and displacing tens of thousands of people. Many experts, researchers, business, and public organizations, as well as NGOs, have organized their efforts in response to this tragic tragedy. Within the current turbulent and unstable sociopolitical landscape brought about by the 4th of August events, Beirut is impoverished by a series of poor management where sectarian violence has emerged as a crucial mobilizing agent in the struggle for urban reformation or preservation, despite local and international organizations providing help and assistance for many. Since August 4th, the impact of the Beirut Port blast has provided an opportunity for many local and international professionals, scholars, and opportunistic developers to evaluate the relationship between many critical aspects of city planning, such as the city's relationship to its suburbs, waterfront, and city center (Aouad & Kaloustian, 2021).

The absence of local planning and cross-sectoral master plans has resulted in the formation of clusters inside the city; the city center has become one of them, isolated from its shoreline. Furthermore, the conflict between the desire to protect the heritage and the complexity of its urban development has resulted in greater urbanization and city expansion, with infrastructure and service systems becoming progressively insufficient over time. Since the blast, the impact of a lack of public places on urban climate, urban division, and inequality has only become worse, resulting in a combined and negative influence on the quality of city life (Aouad & Kaloustian, 2021).

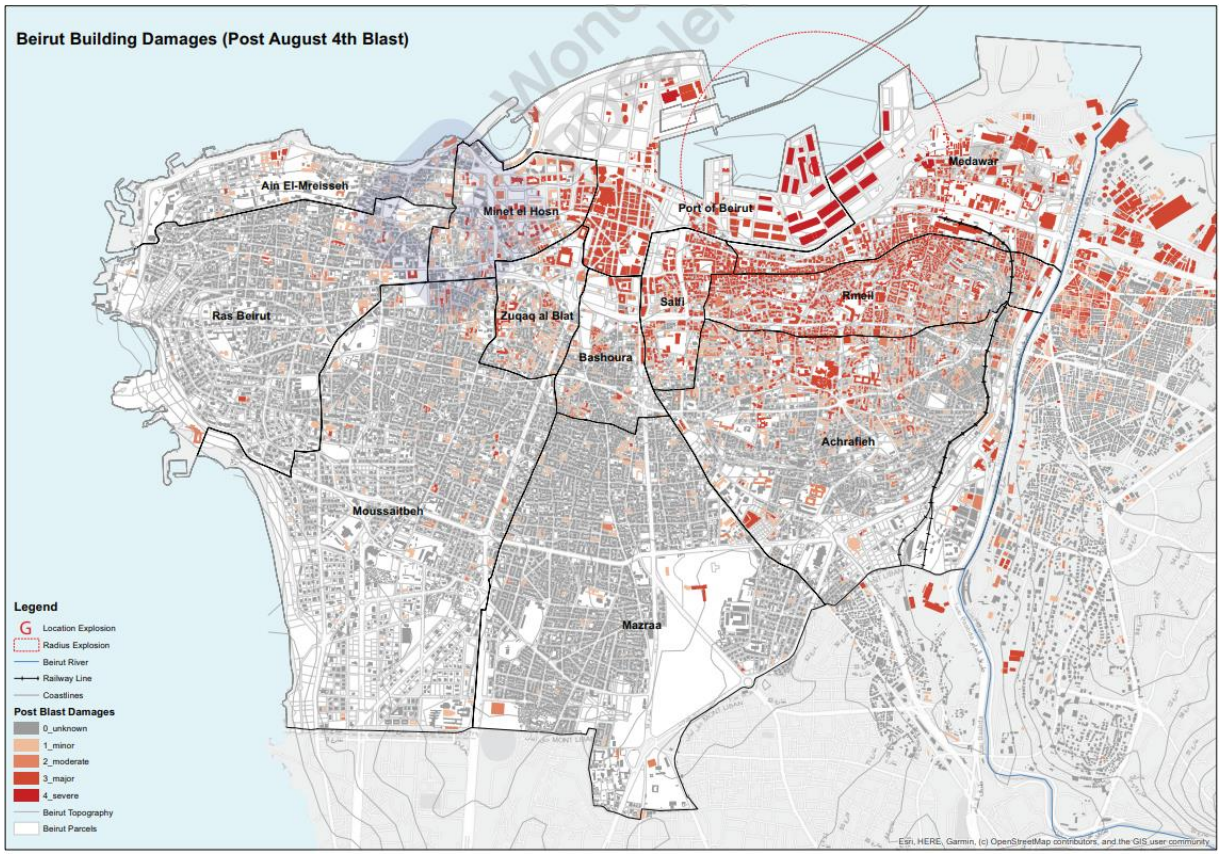

Figure 1 Post-blast building damages in Beirut. (David Aouad, 2022)

1.1 Research Problem

Major disasters cause physical, social, and economic devastation to cities. A massive blow struck Beirut's center, the harbor, on the 4th of August 2020. The blast was dubbed the most powerful non-nuclear bombardment of the twenty-first century (McCarthy, 2020). Over 200 people were murdered, 5,000 were injured, and 300,000 more were on the verge of being homeless (BBC, 10/08/2020). In just a few minutes, 40% of the city was destroyed.

According to recent sources, an investigation into the disastrous 2020 explosion at Beirut port, which has delayed owing to pressure from senior officials, may meet a new roadblock in the form of the prosecution dismissing any charges. (2020, Arabian Business). As a result, a question arises "Can we use this catastrophe, this tragedy, to become better people? How can we recover in a sustainable, inclusive, and efficient manner? Is it possible to recover more quickly?"

1.2 Aim and Objectives

The goal of this classic experiment is “propose local policies for rebuilding Beirut urban port.” The research aims to achieve the following goals in order to achieve this goal:

- Investigating urban rebuilding options in post-disaster cities
- Examining comparable situations and assessing the relationship between trauma, method, and the role of urban rebuilding in post-disaster practices.
- Comparing urban rebuilding strategies utilized in comparable instance nations
- Analyzing degrees of devastation and a country's potential to reconstruct

1.3 Research Hypothesis

The study hypothesizes that a mixed approach addressing multiple sectors in geographically circumscribed areas with cities, putting culture at the center of the reconstruction process by embedding cultural heritage at the foundation of place and people-based policies, and financing urban reconstruction will help Beirut overcome the blast and rebuild resilience.

1.4 Research Methodology

To achieve the aim and objectives of the research, and in attempt to validate the proposed hypothesis, the research is divided into two parts: The theoretical part and the practical part. As for the first part, the researcher will review the literature, going through previous attempts in urban reconstruction in the aftermath of disaster. It will thus use an in-depth desk study in an analytical comparative approach for different similar examples. In the second part, the research will use the qualitative methods in an unstructured interview to help explain, better understand, and explore research subjects' opinions, behavior, experiences, and phenomenon.

2. Literature Review

Lebanon is a geopolitically complicated little upper-middle-income Mediterranean country. First, a 15-year civil war between 1975 and 1990 resulted in a precarious and complex balance of shared political leadership and religious affiliations, which has reportedly led to significant corruption (Lebanon is ranked 137th out of 180 countries) and notable mismanagement, casting doubt on culpability for the disaster and even the ability to orchestrate recovery efforts (Transparency International, 2020).

Second, the ten-year Syrian crisis resulted in a large influx of refugees, with Lebanon opening its northern border and accepting millions of people escaping bloodshed. The Syrian refugees have been added to the estimated half-million Palestinian refugees who have been uprooted by the Arab Israeli war. As a result, Lebanon now has the greatest refugee-to-population ratio in the world, with one out of every four residents being refugees. A country with a large number of refugees can be an indication of a sovereign nation's desire to 'do its part,' but the admission of such large numbers, both absolute and proportionate, has resulted in significant political and economic conflicts (ACRM, 2020).

Third, countrywide demonstrations against the government stalled the economy in late 2019, causing the Lebanese currency to drop by about 80% in a few of months and triggering waves of hyperinflation. Approximately half of Lebanese, or 3.5 million people, live in poverty and face food insecurity and huge unemployment (McEvoy, 2020).

Fourth, while COVID19 has spread to practically every corner of the globe, it is clear that the pandemic has had disproportionate consequences in fragile contexts such as Lebanon, particularly in the aftermath of the horrific blast, where public health infrastructure is lacking. For example, the International Rescue Committee stated that COVID19 infections had surged by 220 percent in Lebanon after the explosion (International Rescue Committee, 2020).

Lebanon had a variety of political, social, and economic issues even before the blast, which impeded the country's capacity to respond to the crisis and plan for the rebuilding phase.

In this chapter, I'll discuss the magnitude of the Beirut explosion and its disastrous consequences on the country's electricity and urbanization systems, as well as inhabitants' health, finances, and basic needs. We were all horrified and saddened by what happened in Beirut, and we felt for the individuals who were touched by this awful event. All of this occurred at a time when the Lebanese were already

suffering economic difficulties. What is required right now – and what the Lebanese people have a right to demand – is to shed light on the origins of this catastrophe and to reduce the immediate implications of the devastation.

2.1 Divided and Polarized Cities:

In recent years, researchers, planners, developers, and policymakers alike have focused on the notion of split cities as a fruitful model for comprehending social, cultural, economic, and political differences. The split city is a physical crisis nested within a political crisis (Calame & Charlesworth, 2009); the city's physical character originates from its local spatial, psychological, and economic dynamics, which function semi-autonomously and distinguish it from wider political milieus.

In most circumstances, a divided society will eventually result in a split urban environment, establishing a clear interrelationship between a divided society and a divided city (van Kempen, 2007). It is about the relationship between social ramification and social inequality on the one hand, and spatial segregation on the other. Inequalities can exacerbate inconsistencies and forsake the most vulnerable people of society.

Bollens (2007) discusses the potential role of cities in unifying fragmented societies, arguing that urban design might play a helpful role in reuniting separated cities: *Division—whether it is physical or psychological— is an extremely difficult emotion that spawns hatred, grief, denial, depression, and forgiveness […]. Characterized by potent political, spatial, and social-psychological contestation [cities] are usefully described as "polarized." Where almost all cities are divided socioeconomically and culturally, polarized cities contain a depth of antagonism and opposition beyond what the word divided connotes.* (Bollens, 2012, pp. 16-17)

2.1.1. Beirut: a divided city/society

"Beirut's recovery is similar to that of other divided cities within contested states which are subject to regional pressures and international interventions," writes Craig Larkin in his role to this issue (Larkin, 2013). "Unlike Jerusalem, where the struggle is over contested national sovereignty (Israel and Palestinian Authority) and increasingly exclusive religiopolitical ideologies (Zionism and Islamism), Beirut's battle lines are drawn over the nature of the Lebanese nation-

building project and the elusive search for aysh mushtarak or ‘shared life’ within the confines of Lebanon’s consociational arrangements.”- (Larkin, 2013)

Lebanon's nation-building has always been difficult. Beirut saw a postcolonial regeneration following the French mandate. Beirut's bank secrecy regulations made it the financial capital of the area, with significant trade passing through its port and visitors arriving via its airport to enjoy the seaside hotels and plentiful nightlife. Beirut was transformed into the Arab world's Disneyland. It was also a haven for dissident Arab intellectuals, including Syrian refugees escaping the Baathist dictatorship, who set up publishing businesses and lectured at universities.

Beirut is home to 17 or 18 religious sects and secular organizations. They coexisted in distinct enclaves for centuries, although some areas were religiously mixed. Although Beirut's historic city walls and ramparts are no longer in use, the nineteenth-century defense walls and Phoenician archeological remains served as the principal separation between Christians in the east and Muslims in the south and west. This boundary was strengthened further amid sectarian violence in 1956–1958, as well as interruptions in constitutional power-sharing arrangements.

Migrants from the rural highlands and Palestinian refugees settled on Beirut's southern suburbs. These “camp-cities” (Agier, 2007) burgeoned after “Black September” of 1970, when Jordan drove out more Palestinians. The quarter-million Palestinian refugees are not citizens; they are also forbidden from owning property or working in professions. The displaced were portrayed in public discourse as interlopers and outsiders, premodern folk unsuited to urban life, exiles inside their own city, "betwixt and between" (Sawalha, 2003). However, refugees become residents, and camps become cities. Finally, disenfranchised Palestinians assaulted Israel, prompting retaliation assaults and invasions by Israel, Syria, and other troops, causing chaos on the Lebanese as well. From 1975 through 1990, Christian, Druze, and Muslim Lebanese fought a civil war. By the end of 1975, downtown Beirut had turned into a battlefield monitored by snipers based in high-rise buildings. Roads had been blocked. Commerce was finished. Residents of mixed-use zones were evicted. Central Beirut was reduced to a rubble-strewn wasteland. This "Green Line" separated the city along an axis spanning from Martyrs' Square in the historic center out to the refugee camps on the outskirts. The government had to flee. Key service providers, foreign banks, insurance companies, and publishing houses all fled Beirut. The city was divided into militia-controlled "mini-states" that progressively split into two camps.

By the end of the civil war, one-fourth of Beirut's housing units had been damaged or demolished, with some leveled to allow military vehicles to drive, and half of the inhabitants had temporarily or permanently fled their homes (Sawalha, 2003, p. 272). Property rights got muddled for long-term squatters who sought sanctuary in abandoned flats and building owners whose structures were harmed. The civil war concluded in 1990, elections were conducted, and the military checkpoints guarding the Green Line divide were decommissioned.

Just as the damaged city represented the material manifestation of the civil war's stalemate, its rehabilitation represented the rebuilding of the entire country. By the mid-1980s, Beirut's elites wanted to reconstruct downtown as a public venue for interconfessional interaction, similar to how the ancient souks served to Muslims and Christians, Arabs and Westerners.

The postwar administration, under by Prime Minister Rafiq al-Hariri, set about rebuilding the Downtown, including the airport, port, and roadways. It established a joint stock corporation, the Lebanese Company for the Development and Reconstruction of Beirut, or Solidere, to plan and supervise the renovation. The unifying theme for this public-private cooperation was "Beirut, an Ancient City for the Future." Landowners were given shares in the corporation to help it get started, while additional shares were offered on the open market to Lebanese and Arabs. The agency was granted eminent domain powers in order to revitalize the center city. Although Solidere initially intended to save certain structures, it razed the majority of the old centre and constructed contemporary buildings on top of it, displacing residents in the process. New souks and shopping complexes, once again centered on Martyrs' Square, began to foster public engagement or at least copresence among disparate groups. The transformation of downtown into a contemporary but socioeconomically isolated neighborhood provided a new playground for a worldwide, particularly wealthy Arab elite (Shwayrik, 2008). Indeed, Solidere's "Disney-fied" Beirut has become a model for urban development in other Arab towns such as Amman; international construction businesses from the Arab Gulf, such as Sama Dubai, are creating cities in the area in its image.

The "popular" classes have not been completely eliminated from the "global city" center. Pre-civil war Beirut, like pre-civil war Paris, had a tradition of political parties organizing enormous rallies, marching from the poorer parts of the south to the seat of authority to express their opinions. Although the center remained closed to marches for much of the 1970s and 1980s, the conclusion of the war brought about a new kind of popular expression in the city (Chaoul, 2007). Indeed, following another battle with Israel, and in a re-enactment of the April

23, 1969, Palestinian clashes, demonstrators held the area and sought a change in leadership. Residents are also rejecting the Solidere "growth engine" that is converting central Beirut into a worldwide tourist destination by using public space for the arts or demonstrations in a spontaneous and unstructured manner (Esheshtawy, 2008).

Since 2007, the economy has risen at a rate of about 9% each year. Real estate investment, banking, shipping, and tourism are gradually returning to Beirut. Nonetheless, the downtown's sophisticated infrastructure contrasts with the ongoing poverty of the refugee camps and slums developed by the Israeli and Syrian occupations and Hizbollah bloodshed of the previous decade. Although areas have been created and new people have arrived, the city remains ethnically divided. The subsequent conflicts decimated not just the urban infrastructure, but also the urban social fabric. The norm in most Middle Eastern cities is extreme economic disparity and uneven growth. Geopolitics influence urban prosperity.

Craig Larkin's post-civil war interpretation Beirut explores how postwar youth remember, envision, and meet a city formerly divided by a no-land man's and interrupted by no-go zones. Beirut has subsequently rebuilt its downtown, although certain relics of the conflict remain in the cityscape as part of the official touristic story of a phoenix rising from the ashes. The practical, vernacular, and political uses of the city's rebuilt public spaces reflect the emergence of new local identities and social interaction across deep and long-lasting borders. Rebuilding the divided city necessitates selective memory and forgetfulness, nostalgia for the past and future hopes.

In addition to tangible reminders and cross-social contact in public spaces, Beiruti adolescents view the city via the prism of memories passed down from generation to generation but tinged by current situations. Larkin identifies how a new generation imbues space with memory and identity, uses it in new ways, both reproducing and transcending older social and spatial boundaries of the city, by applying Lefebvre's three interconnected modes of socially produced space—the perceived, the conceived, and the lived—arguments Zukin's about authentic urban space, and the distinction between history and heritage.

Table 1 Urban consequences of the divisions in Beirut. (David Aouad, 2022) – Graphics managed by author

Type	Consequences
Functional Consequences	Decline in central functions of the urban core Segregation of residential areas, ethnic enclaves Bipolarization of commercial areas Fading primacy of capital city administrative functions Duplication of urban functions (transportation, services, etc) Change of functions in urban space
Structural Consequences	Change in urban development patterns Road-dominated environment and proliferation of cul-de-sacs Presence of frontier landscape Proliferation of vacant land Deterioration of buildings Division of everyday artefacts
Socio – Economic Consequences	Economic depression and chronic fear Population exchange, homogeneous zones Socio-economic divisions parallel with ethnic divisions

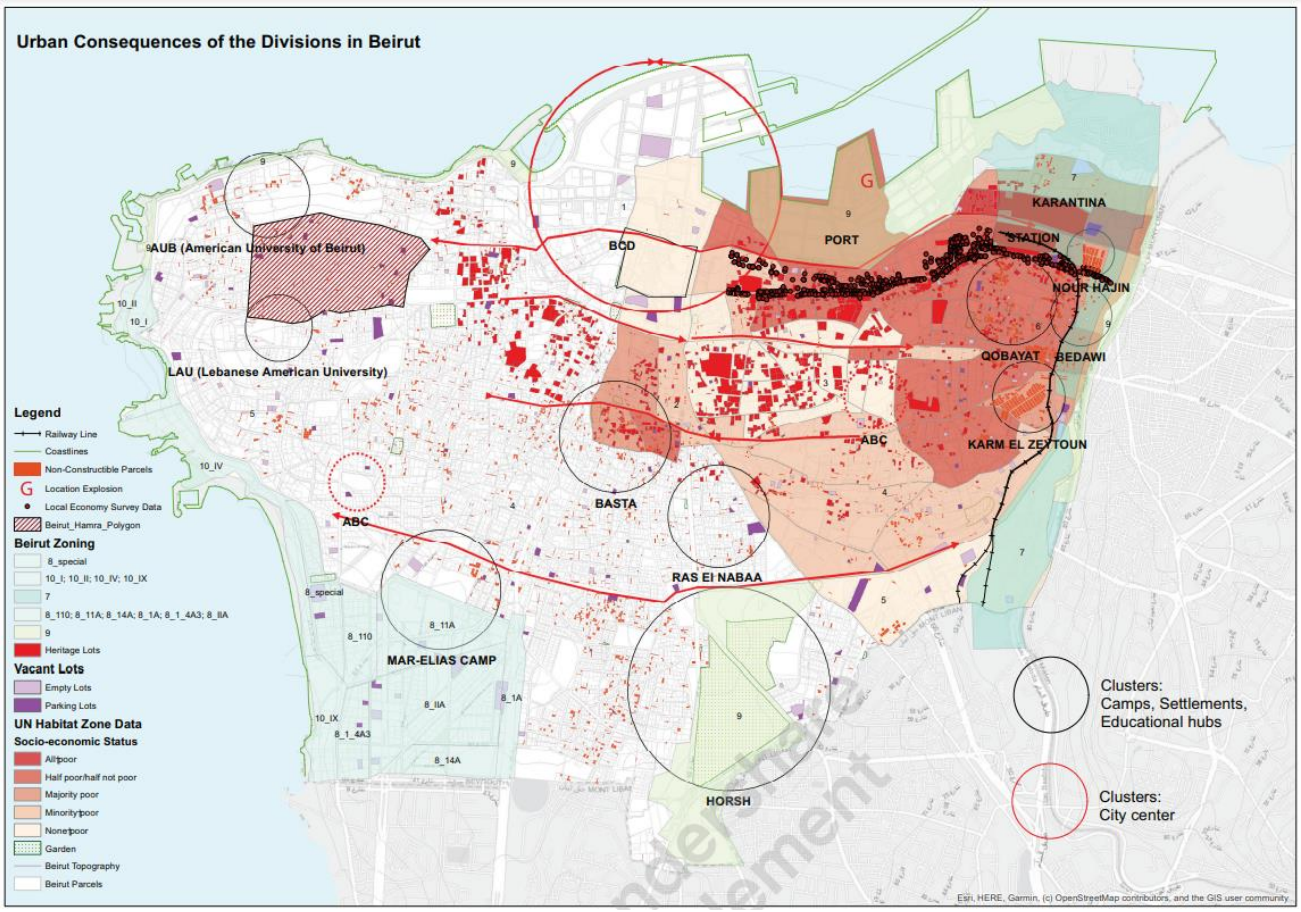

Figure 2 Urban consequences of the divisions in Beirut. Source: David Aouad, 2022

2.2 Unconsidered Urban plans

Before, during, and after the Lebanese Civil War (1975–1990), Beirut's physical arrangement aided the development of opposing ideologies (Yassin, 2008). Many ideas and reconstruction plans have been offered since the civil war; yet the challenges that have plagued their implementation remain the same. They are particularly visible in the reconstruction of the center (Beirut Central District [BCD]), which represents and alleviates Lebanon's postwar shortcomings: inequality, corruption, and segregation (Larkin, 2010a). With an ambiguous state constitution and outsourced public works, urban planning has become a battleground between religious political organizations and profitseeking developers (Bou Akar, 2018).

According to Verdeil (2012), there are four periods of reconstruction in Beirut and its suburbs: (1) the first downtown reconstruction project in 1977 after the twoyear war; (2) the second downtown Beirut reconstruction attempt in 1982–1983, which was never adopted; (3) the reconstruction of the BCD, which has been entrusted to Solidere since 1991; and (4) the case of the postwar reconstruction of Haret Hreik (Waad Project), in 2006. Furthermore, the postwar rebuilding period was defined by two national plans: the National Emergency Reconstruction Plan, which was in charge of the first five years of reconstruction, and Plan Horizon 2000, which was subsequently supplemented by Plan Horizon in 2005. The Council for Development and Rehabilitation, founded in 1977 as a public central administration organization for all reconstruction efforts, oversaw the two programs. More than 100 projects were planned across 15 sectors, with funds mostly coming from international and domestic loans (United Nations Human Settlements Programme, 2003).

The aforementioned ideas were never about providing a comprehensive and longterm planning solution for the entire Lebanese area; instead, they supported selective urbanization and divides, based on rapid solutions from a developer's standpoint. This argument may be extended to suggest that the rebuilding plans almost treated the region as an informal zone, sequestered and insulated from all circumstances. In their chapter on "gray spaces" in divided cities, Avni and Yiftachel (2014) argue that there are several typical stages of urban policy responses to the emergence of informality within the process of "gray spacing" in the sense of informal development where ignoring, neglecting, limiting, and selectively whitening can be described as the toolkit of managing the unwanted/irremovable in today's urban regions. The country has continued to turn

a blind eye to what is truly needed, proposed underdeveloped schemes and policies, violently limited intervention areas, and pushed for anesthesia, privatization, and gentrification by ignoring citizens' needs, ignoring real urban issues, limiting interventions, and selectively whitening certain areas such as Solidere. When the multiple systems that are necessary for the city's operation fail or become inefficient, negative economic, social, and environmental consequences emerge. In addition to the shortfall in government service supply due to poor management methods, urban informal systems arise, complementing or competing with formal services to address the demands of city people on a daily basis (Farajalla et al., 2017). The BCD, for example, promised social recovery through economic redevelopment (Fricke, 2005); however, it was designed in isolation, surrounding the city center with a restricted ring road and a connecting to the motorway heading to the airport. It succeeded to isolate the city from its center and displaced families, owners, and tenants by creating a vacuum within the city, an area devoid of social significance (Larkin, 2010a; Yahya, 2004). More importantly, the sectarianized and enclaved city remained spatially separated across war-induced sectarian lines, implying a failure to return to normalcy (Yassin, 2012). Citizens in war-torn cities are also forced to consider urban hostility and tolerance, as well as how designers, planners, and legislators might help alleviate racial and socioeconomic division in practical ways (Calame & Charlesworth, 2009)

Many of the proposals offered by experts asked to assist in the postwar reconstruction effort, on the other hand, looked impractical (Charlesworth, 2007). They frequently propose quick interventions that appeal to international donors, investors, and developers, hastening the fundamental causes of conflict in some cases due to either their lack of experience working in divided political and physical landscapes or a lack of interest in finding real solutions to serious urban issues. Local and foreign architects put forward functionalist planning and zoning as a way to deal with sectarianism (Bollens, 2012) and the obsession with building iconic landmarks, assuming that the systematic rebuilding of the devasted city's historic core would restore the city to its prewar identity and community spirit almost immediately. The reality that the surrounding urban fabric, infrastructure, and social fiber are all in disarray is routinely neglected in such settings. Most of the time, residual regions, transition zones, and conflict borders, as well as the frequently abandoned and neglected peripheries of city centers, were overlooked (Charlesworth, 2007). Despite some attempts to refocus Beirut on a larger Lebanese state building project and the region's ever-changing geopolitics (Larkin, 2010b), it was clear that some pillar planning terms like connectivity, mobility, middle class, sustainability, heritage preservation, social

inclusion, public space, environment, and demography were doomed to become obsolete.

Political chances may exist in post-conflict cities, spurred by the appeal of the notion of city reconstruction. The numerous processes behind the reconsolidation of a national identity and economic recovery, as well as ambitious political initiatives and a long-term plan, might be misleading (Charlesworth, 2007). Since the port explosion in August 2020, there has been a growing awareness of the city's plight, its failing urban history, and its uncertain future.

2.3 Sociological Survey

The Beirut blast destroyed the northern part of the capital, causing roughly 40,000 structures to be damaged. New contemporary structures recently constructed by local international architects are now confronting reconstruction challenges, posing existential concerns such as: How should "new" damaged building rehabilitation initiatives look like? Should architects recreate them as they were before the explosion, obliterating the damage, or should they leave scars and depict new realities?

ArchDaily had the opportunity to get down with three architects whose buildings were harmed by the bomb in order to explore ideas and showcase diverse views. With ArchDaily's Managing Editor, Christele Harrouk, and Architectural Photographer Laurian Ghinitoiu, who captured the depth of the devastation in a featured picture series, Bernard Khoury, Paul Kaloustian, and Lina Ghotmeh discussed their ideas and vision for Beirut's rehabilitation.

Three of Bernard Khoury's structures were immediately struck by the shock waves during the blast: the freshly finished Saifi #450 tower, plot #1063 (R2), and #1072, the blast's nearest residential buildings. One of those structures, oddly enough, had two guns on top of it. The cladding, glass, wood, metal, and aluminum parts, as well as certain structural flaws, were all lost on these extremely young giants, which were given generic names based on their plot numbers. Khoury spoke with ArchDaily in his Beirut office about his views on Lebanese history and his rehabilitation initiatives.

ArchDaily: Three of your projects got affected in the blast. What was the role of these particular structures in the fabric of the city and how did they address history?

Bernard Khoury: *"These three buildings, plot #450, plot #1063 (R2), and plot #1072, were very contextual buildings in many ways, addressing geography and taking the port's colors, in order to become an extension of the existing city. Shifting from the dangerous and simplistic representation of* Beirut*, these structures took on a different tint, different from what some have been trying to give the city.* Beirut *is not "beige". My criticism of this monochromatic beige tableau goes way back. It starts with my early reactions towards the Solidere project, the post-civil war reconstruction of the city center carried out in the 90s, and its relationship to history, which stops for some reason at the French mandate. There is no reference to the history that was so much closer to me, the Republic, and the Modern Nation. Unfortunately, this take on history is still predominant when it comes to heritage and when it comes to talking about the history of this city. When there are talks about the architectural heritage being hit, everyone immediately points at the Gemmayze neighborhood with its ottoman and colonial houses, but no one ever mentions any other building built post the 1950's. It's always the past or the future. It's impossible to exist in the present, and my definition of present would go as far as the early days of Independence. Back to my projects, what was particularly interesting in the* Saifi *#450 is its location at the edge of Solidere that reflects events that some of us are not very proud of, and that we simply don't want to include in our sugar-coated, monochromatic, and dangerously simplistic history. My architecture has been very much along those lines, ever since the evolving scars project in 1991, to the very first buildings I executed, B018 in 1998, followed by Centrale in 1999 and Yabani in the early 2000s. Although they were very much post-war buildings, for me war is not over."* – (Harrouk Christele, 2021)

ArchDaily: How would you imagine the reconstruction efforts in Beirut?

Bernard Khoury: "*I would take it case by case. When it comes to Mar Mkhayel and to these sectors, I think the reconstruction will be organic. After all, it is not a zone that has been deserted, it's a totally different scenario from the Solidere project. I also think it will be much faster than we think*." – (Harrouk Christele, 2021)

ArchDaily: How would you operate on your projects? And are you already in talks with developers to find solutions?

Bernard Khoury: *"It's strange to operate on your own baby. Put it this way. I've worked before on older buildings that were not mine, but now these are my own babies and they're quite young. I look at it as a surgical operation, and it's definitely very interesting to see to what extent your patient is going to want to*

totally erase or acknowledge some scars. I've already sat down with developers of the most damaged project of the three, the #1072, and we've agreed on one thing: It will not be exactly as it was. I think that's a statement. You would think that after this trauma, people would want to totally wipe out any trace of what has happened, but that's not the case.
When we started working on this project back in 2009, over 10 years ago, corporate developers had their recipes, numbers that you have to match, specific methods and materials of construction. A large percentage of the cost was in foreign currency at the time. We lived in a financial bubble, the industry was part of it, and developers wanted to work with certain standards. They would for example pay huge amounts for cladding imported from China rather than taking the risk of developing something locally that might cost less but that cannot be evaluated by the book or specified on papers.

Now the skin is gone, and to go back to our former way of doing things will be financially suicidal. What I propose is to replace whatever was damaged by something that is transformed locally. We are currently in the process of assessing the percentage of surfaces that are salvageable, and the percentage of surfaces that are no longer there, and based on that, we will have clearer ideas. We started the discussion purely from a financial and economical angle, but that also could be very political." – (Harrouk Christele, 2021)

According to Paul Kaloustian, despite the fact that the damage to his projects was small in comparison to the enormity of the bomb, he was faced with the knowledge that a large portion of his profession had been impacted and would never be the same. Seeing his ventures fail, such as the famed Ballroom Blitz nightclub, filled him with resentment. Paul spoke with ArchDaily about his architectural ideas in one of his renovated interventions in the Gemmayze district.

ArchDaily: How do you think this Blast will impact the architectural scene?

Paul Kaloustian: "*I think the three main events that occurred last year, the economic collapse, the coronavirus, and the blast, gave the Lebanese design*

community, or the people who are interested in thinking further, time to take a step back, look from afar and reflect on our reality. Actually, I feel that, now, we're living in limbo outside of reality, the reality being our infected and corrupted past life. We as designers found a way to work in this chaos.

Alain Badiou, a French Philosopher talks about the theory of the event. By event, he actually means a shift in realities, a change that makes things different and without it, no transformation would have been possible. Maybe we should perceive this blast as an event, with a "before" and an "after". People usually react immediately, especially in our culture, and fix what is broken. They rebuild, and in other words, they go back to the past. What I am proposing for myself is to take some distance to think of new possibilities, of a new world, to take this as an event and not get busy in reconstruction without having the time to invent something new. I'm not saying that I'm going to do a revolution and change the system, but at least our way of thinking should be different. I'm not sure how, but at least it's about breaking out from this prevailing chaos and start creating outside of this reality.
Taking a distance and producing something different. Shifting our architecture in a sense that we start thinking of nature more often, of permeability and outside connections, etc., leaving the flamboyant behind. We should get back to our human scale. Our chance is this step back. This is where I am at the moment, it's not very specific but if this happens on a big scale, there would be some momentum of change. Revolution should be in ideas." – (Harrouk Christele, 2021)

ArchDaily: How do you perceive Reconstruction? What should be rebuilt exactly the same and what shouldn't? How would you save the urban Fabric and the collective memory**?**

Paul Kaloustian: *"Zumthor takes history as something that is in movement. If he has ruins, he will build on them, creating a new layer. This is quite daring, but also very interesting for us. The formula is easy in terms of restoration, but when it comes to the urban fabric, it's much more complex, especially that it was*

already in peril. I believe as architects we cannot resolve this issue, there must be special regulations and policies.

On another hand, buildings cannot be rebuilt exactly like they were before the blast. Even signature buildings. Something should say that this is a different epoch. Lebbeus Woods proposed organisms connected to existing structures for example. Following this same logic, what if we imagine something similar in our case, new additions to our private residential buildings, creating semi-public spaces, and opening to the city. This shows positivism by injecting what we as architects think is important into the private sector, such as public space, nature, etc. The most important thing is not to fall for kitsch, symbolism, and cheesy romantic approaches." – (Harrouk Christele, 2021)

ArchDaily: How do you think this event will change your future conceptual process and your approach to architecture?

Paul Kaloustian: *"Before the blast, I was already interested in a certain new kind of architecture and I was pursuing it through new forms, new space. I was on the right track in terms of vision, but I think I need to take these concepts a bit further. First, we have to locate ourselves within the planet situation, and the local situation. My direction is a bit more towards going back to the essence of the human, introducing light approaches, creating new perceptions, experimenting with scales, and always ask: why not and how to do it differently? Basically, it's about making people reconnect with the enchantment of the world. In my opinion, there is no place anymore for dogmas or movements, each architect has the freedom to pursue his own style, going in his own direction."* – (Harrouk Christele, 2021)

When the bomb occurred, Lina Ghotmeh's Stone Garden project was nearing completion. The sculpted bulk withstood the blast despite being only a mile distant, but all of its glass and metal parts were entirely obliterated. ArchDaily spoke with the architect about the disaster's influence on her project as well as her thoughts on Beirut's modern architectural rehabilitation.

ArchDaily: What projects of yours got affected in the blast? what is the extent of the damages?

Lina Ghotmeh: *"I have just completed the Stone Garden project, a tower near the Port and barely a mile away from the location of the explosion. This is a building dedicated to housing and an art gallery dedicated to image and production in the Middle East (Mina Image Center). The project had both an architectural significance and a social one. Architecturally, I intended this tower as an expression of the city of Beirut, its built scape, its history. It is a sculpted tower, anchored in its ground, hand combed by skilled artisans; it held a positive out-take on the city harvesting nature at the heights of Beirut. All the windows had inbuilt gardens along with the floors. It is a kind of hopeful Renaissance. The building had also a social meaning, the gallery revived Middle eastern photography, image production. Crossing as Beirut civilizations and cultures in its content. The apartments are all different, individualized by their owners. One can escape with freedom here from the typical and prototypical generic apartment plans that continuously dictated a social family structure in the city.*

The explosion fell really along my trip to finalize the last finishes and deliver the project. The building with its measured glass façade acted as a bunker. Its massive earthly body was intact. The young trees remained in position at heights. Nonetheless all the windows, the metalwork was completely shattered, the elevators totally warped. The interiors of the apartments all out of place….

The developer already 3D scanned all the building to evaluate the damages. The great difficulty today is the funding, how to finance all the works of rehabilitation. It is very difficult; everyone is on the verge of bankruptcy and no means at the moment…"– (Harrouk Christele, 2021)

ArchDaily: Can you tell us more about your philosophy on the issue- on how reconstruction efforts of "new" buildings should look like?

Lina Ghotmeh: *"One has to question the public dimension of the buildings, the explosion – as violent it may be – proved that all these structures are interlinked, they got more or less damaged. The question now is what new relation with the public space can we establish and integrate. I am also questioning this time*

between the destruction and the start of reconstruction. How can we exploit this ruin?

There is almost the possibility to transform this in-between state of the buildings. What if these structures become Public Labs while waiting for reconstruction, or accentuated havens of green life? I also feel that there is also a poetic aspect to bring into the building's interior, I am still very much marked with the glass shattering. I keep seeing the interiors all enveloped with glass debris in my mind". – (Harrouk Christele, 2021)

2.4 Scientifical theory on Common Resources

Common goods are rivalrous and non-excludable products. This indicates that anybody has access to the good, but that using it lowers the capacity of someone else to utilize it. Fish stocks in international waters are a classic example of a common good; no one is barred from fishing, yet as individuals extract fish without limitations, the reserves for future fishermen are possibly diminished.

I picked the book-length studies on the commons by Wade ([1988] 1994), Ostrom (1990), and Baland and Platteau from among the numerous comparative studies on the commons (1996). Two of these, by Wade and Ostrom, were published more than a decade ago and may be considered as the forerunners of a flood of new publications on the commons that have put an end to the concept that common property is a historical oddity. The key positive lessons I take away from comparing these writers are how they demonstrate that, given certain combinations of regularly occurring events, members of small groups may construct institutional arrangements that aid in resource management.

They go on to identify the exact variables that are most likely to encourage local resource management. Furthermore, they apply theoretical ideas to defend and explain the empirical regularities that they discover.

It is fair to say that each of the three books is a careful and rigorous conversation between theory and empirical research because of their attention to theoretical developments at the time of writing, their attempt to relate theory to the cases they examine, and their contributions to common property theory.

They all rely on a vast corpus of empirical data to validate the theoretical insights they obtain. Even though the three volumes represent very diverse methods to

empirical comparative study and rely on quite different types of data, their concern for being empirically relevant and holding theory responsible to evidence is clear. One of the most compelling parts of their argument is that each author gets at a summary set of criteria and conclusions that he or she feels are crucial to the viability of commons institutions after extensive debate and study of numerous issues. Their findings represent a realistic beginning point for an examination of the set of characteristics that account for long-term institutional arrangements to manage the commons. However, an examination of their results and some of the ramifications of their work indicates that their hypotheses concerning commons sustainability need to be augmented.

Because there is no single commonly recognized explanation of what makes common property regimes durable, it is crucial to note that these three writers' methods differ significantly. Wade mostly depends on information gathered from South Indian communities in a particular area. His sample is not representative of irrigation institutions in the region, but we may assume that data gathering is consistent in each case. Ostrom employs extensive case studies created by other researchers to test her argument. Because the study she samples is produced independently, all her instances may not have consistently gathered data. However, she investigates each instance with the identical collection of independent and dependent factors.

Baland and Platteau are more lenient in their methodological limitations. They employ a broad survey of the economic literature on property rights to underpin their empirical study, as well as the literature's difficulty to develop unequivocal findings regarding whether private property is preferable to controlled shared property. However, to test the validity of their results, they employ data from several groups of cases. In a significant way, each test's "model specification" is incomplete (King et al., 1994). Wade's (1994) major study on generally managed irrigation systems in South India examines when corporate organizations emerge in these communities and what accounts for their effectiveness in addressing commons challenges using data from 31 villages. 16 In summary, his ideas on the origins of commons institutions point to environmental dangers as a critical role. However, he also gives a highly complex and thorough set of arguments for good commons administration.

According to Wade, effective access and usage restraint rules are unlikely to endure when there are numerous users, the boundaries of the common-pool resource are unclear, users reside in groups spread across a vast region, detecting rule breakers is difficult, and so on (Wade, 1988:215). Wade elaborates on his findings by categorizing many variables as resources, technology, user group,

noticeability, link between resources and user group, and interaction between users and the state (1988:215-216) Wade identifies 14 factors as critical to successful management of the commons under investigation. Most of his requirements are broad assertions about the local environment, user groups, and the resource system, but others are specific to the user-resource interaction. Only one of his requirements is related to the group's external ties or other local circumstances.

Facilitating Conditions Identified by Wade

1. Resource system characteristics

   i. small size
   ii. Well-defined boundaries

2. Group characteristics

   i. small size
   ii. Clearly defined boundaries
   iii. Past successful experiences—social capital
   iv. Interdependence among group members

Relationship between resource system and group characteristics:

   i. Overlap between user group residential location and resource location
   ii. High levels of dependence by group members on resource system

3. Institutional arrangements

   i. Locally devised access and management rules
   ii. Ease in enforcement of rules
   iii. Graduated sanctions

Relationship between resource system and institutional arrangements:

   i. Match restrictions on harvests to regeneration of resources

4. External environment

   i. Technology: Low-cost exclusion technology
   ii. State:
   a. Central governments should not undermine local authority

Baland and Platteau (1996) use a similar technique as Ostrom in their thorough and synthesized analysis of a vast number of works on the commons (1990).

They argue that the primary argument in favor of privatization "rests on the comparison between an imagined totally efficient private property system and the anarchical scenarios induced by open access" (Baland and Platteau, 1996:175). They highlight the distinction between open access and common property arrangements, implying that when private property regimes are compared to regulated common property systems (and when information is perfect and transaction costs are absent), "*regulated common property and private property are equivalent from the standpoint of resource use efficiency*" (Baland and Platteau, 1996:175, emphasis in original). Furthermore, they claim that the privatization of common-pool resources, or their seizure and management by central governments, tends to destroy the implicit rights and individualized connections that characterize common-pool arrangements. As a result, these procedures are likely to reduce efficiency and, much more so, to penalize traditional users, whose rights of use are rarely honored under privatization or state expropriation.

Conclusions Presented by Baland and Platteau as Facilitating Successful Governance of the Commons

1. Resource system characteristics None presented as important

2. Group characteristics

   i. Small size
   ii. Shared norms
   iii. Past successful experiences—social capital
   iv. Appropriate leadership—young, familiar with changing external environments, connected to local traditional elite
   v. Interdependence among group members
   vi. Heterogeneity of endowments, homogeneity of identities and interests

(1 and 2) Relationship between resource system characteristics and group characteristics

   i. Overlap between user group residential location and resource location
   ii. Fairness in allocation of benefits from common resources

3. Institutional arrangements

   i. Rules are simple and easy to understand

ii. Locally devised access and management rules
iii. Ease in enforcement of rules
iv. Accountability of monitors and other officials to users

(1 and 3) Relationship between resource system and institutional arrangements None presented as important

4. External environment

i. Technology: None presented as important
ii. State:

a. Supportive external sanctioning institutions

b. Appropriate levels of external aid to compensate local users for conservation activities

Tragedy of the commons

The commons tragedy is the depletion of a common good by individuals behaving autonomously and rationally in their own self-interest. Take, for example, fish in foreign seas. Individual fishermen will logically choose to catch some of the fish to sell. However, if a large number of fishermen all think this way and capture the same species, the whole stock of fish may be exhausted. When the fish stock is exhausted, none of the fishermen can continue fishing, even if each fisherman would prefer that the fish not be depleted in the long term. The tragedy of the commons refers to circumstances in which people remove resources to attain short-term profits without considering the long-term effects.

However, not all common resources suffer from the tragedy of the commons. Individuals with enlightened self-interest will be aware of the unfavorable long-term consequences of their short-term actions. This is analogous to fishermen understanding that they need limit their fishing in order to protect the fish stock in the long run. In the absence of rational self-interest, the government may intervene through rules or levies to discourage the conduct that leads to the tragedy of the commons. This would be analogous to the government limiting the number of fish that may be caught.

Elinor Ostrom's death on June 12, 2012, only days before the Rio+20 meeting, is a huge loss. She was the first woman to be given the Nobel Prize in Economic Sciences. Her life's work, however, provides several lessons for the discussions, decisions, and route to growth during and beyond Rio. Many of the most

important resources for a sustainable future are tied to the commons in some form - the focus of most of Ostrom's work, which inspired one researcher to call her "the mother of field work in development economics." Water, forests, fisheries, biodiversity, seas, and the atmosphere are all common pool resources in essential ways; it is impossible to restrict people from utilizing them, yet part of that use depletes their availability to others. Usage must be coordinated and controlled to be sustainable – but this does not mean that government administration or privatization are the only possibilities. Ostrom's study proved in minute detail that humans can and have worked cooperatively for hundreds of years to manage common resources sustainably.

Ostrom's Design Principles

1. Resource system characteristics
    i. Well-defined boundaries
2. Group characteristics
    i. Clearly defined boundaries

(1 and 2) Relationship between resource system characteristics and group characteristics

None presented as important

3. Institutional arrangements
    i. Locally devised access and management rules
    ii. Ease in enforcement of rules
    iii. Graduated sanctions
    iv. Availability of low-cost adjudication
    v. Accountability of monitors and other officials to users

(1 and 3) Relationship between resource system and institutional arrangements

    i. Match restrictions on harvests to regeneration of resources

4. External environment
    i. Technology: None presented as important
    ii. State:

a. Central governments should not undermine local authority b. Nested levels of appropriation, provision, enforcement, governance

The expression "Tragedy of the Commons" was created by ecologist Garrett Hardin to describe when people act only in their own self-interest and diminish a shared resource, such as pasture overgrazing. He proposed two solutions to this problem: resource control through government action and privatization.

Hardin's method to the "Tragedy of the Commons" was challenged by Ostrom's work, which argued that people and communities could manage their own communal resources. Her field research in Maine, Indonesia, Nepal, and Kenya resulted in the formulation of a set of design principles that have aided in the effective mobilization of common pool resources (CPR) for local administration in several settings.

With Rio+20, the United Nations Conference on Sustainable Development held in Rio de Janeiro, Brazil, in June 2012, focusing on the "green economy," it is time to recognize the frequently uncounted values that the commons provide. In India, for example, even though commons are frequently labeled as "wastelands," rural households rely on them for feed, firewood, water, medicinal plants, and a variety of non-timber forest products. Although the majority of these are not directly marketed and hence are not included in traditional output estimates, their benefits to livestock production and overall family welfare are significant. These lands provide essential biodiversity and environmental services, successful management results in more reliable and cleaner water supplies for residents downstream.

The commons are not just a rural phenomenon; communal gardens and neighborhood parks enrich city life as well. Unless the commons' values are recognized, there will be temptation to enclose or seize them for private or state purposes that may provide more cash for a few but not necessarily more value - particularly for the poor. Ostrom investigated what makes collaborative action effective in irrigation systems, pastures, forests, and fisheries throughout the world alongside colleagues from diverse disciplines. Cooperation to manage critical resources is not automatic, nor is the "tragedy of the commons." Respect for communal property rights is essential for providing the appropriate incentives for individuals to keep resources. Policies that nationalize or privatize the commons have all too frequently destroyed local users' incentives or power to manage their resources. In their essay "*Insights on linking forests, trees, and people from the air, on the ground, and in the laboratory*," Ostrom and Nagendra

demonstrated the need of allowing communities to create their own standards, ones that are tailored to local conditions. Outsiders' technical and local expertise is useful, but individuals are more willing to monitor and enforce laws that they helped create. Rather than relying on a single, monolithic governance structure, Ostrom's work demonstrates the significance of combining the strengths of many diverse institutions – government agencies, user groups, and commercial players – and cooperating at numerous scales. When challenged about the lack of movement on climate change accords, she stated in her piece "*Green from the Grassroots*" that rather than waiting for a great global agreement, we should seek action at all levels, from our houses to our schools, communities, and nations. As she has stressed throughout her career and in her most recent work, a solution to the challenge of climate change will not come in a single stroke panacea but will need experimentation at numerous levels and varied methods.

The global endeavor to restore balance to the Earth's ecology can be no more than the sum of local efforts, and collaboration at any level must be built on strategies developed through millennia of creating cooperation at the local level. In consequence, the organizations that foster local environmental cooperation are not only beneficial, but also necessary components of any greater environmental success.

In a society where the state or private sector is too frequently viewed as the driving force, Ostrom helped us comprehend institutional variety and ways of administering the commons that capitalize on people's ability for collective action. Her study provides vital insights on how to establish norms and give incentives for cooperation at the many levels required for a sustainable future - (Ruth *Meinzen-Dick, 14 June 2012).*

Conclusions:

Baland and Platteau's results are frequently expressed as broad assertions about users, resources, and institutions, rather than as correlations between the qualities of these constituent analytical units. Only one of their results is relational: the group members' and resource system's contiguous residential location. Finally, compared to Wade and Ostrom, Baland and Platteau give slightly more attention to external influences, as seen by their considerations of external help, enforcement, and leadership with extensive experience. They utilize this variety to establish a set of circumstances that promote higher success in the commons. The cases they explore have a lot of variances in the causal and dependent variables. Unlike Ostrom, who concentrates on the details of institutional

arrangements in accounting for successful commons governance, Wade, Baland, and Platteau cast a wider net and include noninstitutional elements in their results.

They discover four sets of regularities in successful management:

1) resource characteristics
2) nature of groups that rely on resources
3) particulars of institutional regimes through which resources are managed
4) the nature of a group's relationship with external forces and authorities such as markets, states, and technology.

Resource characteristics might include things like the resource's well-defined limits, the riskiness and unpredictability of resource flows, and the resource's mobility. Size, wealth and income levels, different forms of heterogeneity, power dynamics among subgroups, and experience are all features of group characteristics. Institutional regimes can take on a wide variety of forms, but some of the most important components of institutional arrangements have been highlighted as monitoring and punishment, adjudication, and accountability. Finally, a variety of features are related to the interactions of locally located groups, resource systems, and institutional arrangements with the external environment, which includes demographic changes, technology, markets, and the state.

3. Beirut Explosion Impacts:

The world witnessed one of the deadliest explosions in history on the evening of August 4th, 2020 (around 15:00 GMT). The fire and subsequent blasts were initially witnessed and reported by civilians in the Lebanese republic and were published as videos and posts on various social media websites, after which news reports began to arrive. The big explosion occurred in a warehouse where ammonium nitrate and dozens of bags of fireworks were being stored. Two bombs happened in succession, one smaller and the other larger, resulting in blast and shock waves stretching throughout diverse regions surrounding the harbor.

3.1 Damage Severity

The blast occurred near Beirut's port, in the city's northern outskirts. It caused devastation on surrounding structures, grain silos, and warehouses. Ceilings fell, windows and walls blew out, and debris was thrown up to two kilometers from the harbor (BBC News, 2020). In addition, cars and a cruise ship were inverted, and the streets were littered with wreckage from surrounding damaged buildings. A ship was blasted out of the sea near the explosion location and landed on a wharf (BBC News, 2020). This shows how powerful the explosion was and how much damage it did. Given that the explosion caught everyone off guard, the capacity of the explosion to demolish such vast infrastructures demonstrates the immense agony and harm that mankind was subjected to.

The port has long been an important element in Lebanon's goods supply network, handling 60 percent of the country's imports (Somwanshi, 2020). The explosion was massive, destroying the immediate dockside area and leaving a 140-meter-wide crater in its wake (BBC News, 2020). The ammonium nitrate warehouse was completely destroyed, while the adjacent grain silo was severely damaged as seen in Figure 3 (BBC News, 2020).

A ship was also blown completely out of the sea and onto the dockside, according to sources (BBC News, 2020). The grain terminal and grain silos in the port were destroyed by the explosion. The demolished silos included a substantial amount of grain that was part of the country's strategic grain reserves, posing a direct threat to the country's economy (Somwanshi, 2020). The silos, which had a total capacity of 120,000 metric tons of grain and were made up of 48 large cells and 50 tiny cells, housed 85 percent of the country's cereal (Somwanshi, 2020). However, it is thought that the silos were not at full capacity at the time of the explosion since the country was trying to fulfill a bread shortage caused by the recent financial crisis. Approximately 15,000 tons of grain were burned, leaving Lebanon with a grain store of less than one month. However, the wheat that survived the explosion was inedible, causing the country to face increased food shortages.

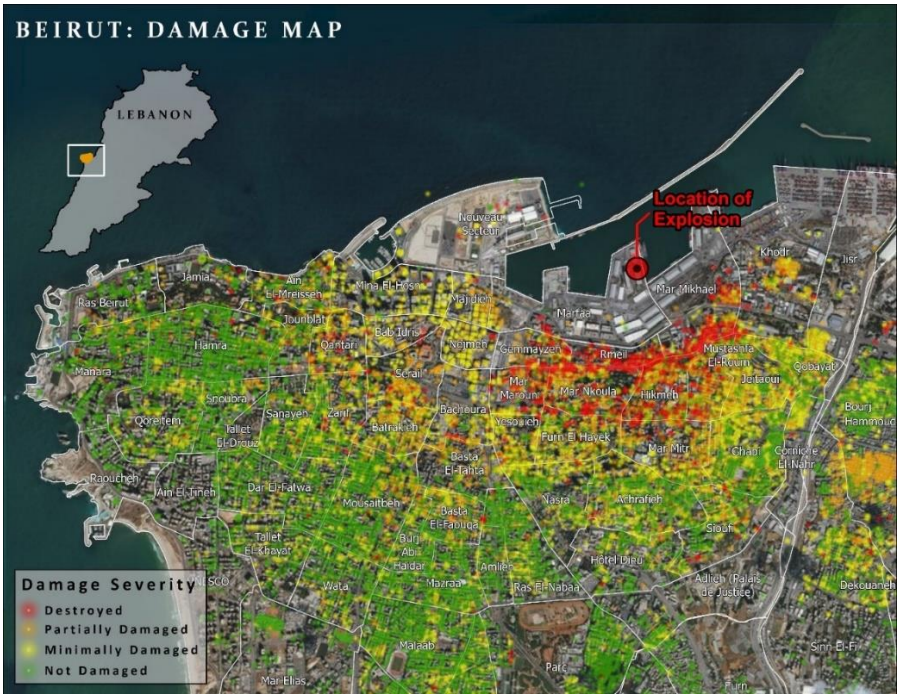

Figure 3: Ipsos Risk analytics, (World Bank,2020)

Figure 3 shows the immediate assessment by Ipsos risk analytics indicating the severity of the damage caused by the explosion. The districts closest to the Beirut port where the explosion occurred were completely destroyed (Mar Mikhael and Karantina), while the districts further away (Saifi, Achrafiye, and downtown) were either partially or minimally damaged.

Damages and Losses statistics

a) 52% of housing within the blast radius was damaged.
b) Of the total 14,324 housing units surveyed, 864 (6%) were destroyed.
c) 55% of 143 schools in the blast radius were damaged, 18 of them heavily damaged or destroyed.
d) 43% of cultural heritage sites (including museums, places of worship, cinemas, etc.) were damaged.
e) Of 3,430 cultural heritage sites, 359 (10%) were destroyed.

Damage Level	No.	%
Minor	2,236	33.81
Moderate	1,364	20.62
Major	2,981	45.08
Severe	31	0.47

Note: Surveyed from a total of 6,612 damaged buildings. Source: Order of Engineers and Architects (2020).

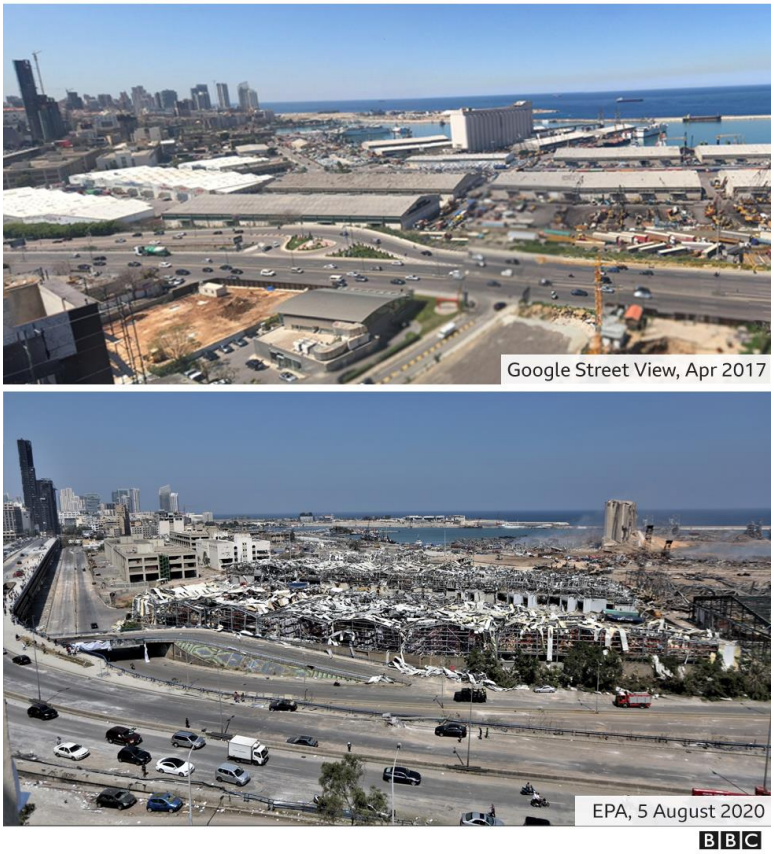

Figure 4 Devastation on Beirut Dockside (BBC News, 2020)

3.2 Social Impact

Six months later, the extent of the explosion's invisible mental health consequences is still unknown. Several reports have highlighted the collective trauma experienced by explosion survivors, including nightmares and fatigue, as well as an augmented need for mental health sessions. Even in the months after the explosion, there were reports of increased depression, as well as higher rates of suicides and calls to suicide hotlines—much of which was attributed to Lebanon's deteriorating economic situation, which resulted in an unemployment rate of more than 30 percent, deflation of the Lebanese pound, and hyperinflation of food and crucial medications. The explosion also brought back memories of previous traumas endured by generations of Lebanese citizens who had endured multiple civil wars, displacement, and, most recently, increased violence and civil unrest during mass anti-government demonstrations. Those on the frontlines were particularly hard hit, including health workers who, already overburdened by the rapid rise in COVID-19 cases, were unrehearsed for the aftermath of the explosion and worked for days on end to treat the wounded despite limited resources (Fig. 4).

Humanitarian workers and volunteers who responded immediately after the blast, such as those with the Lebanese Red Cross, described the devastation they encountered while digging through the rubble to rescue victims, as well as the grief felt by aid workers who had also lost friends and family. Therapists and social workers who were directly traumatized by the explosion reported severe distress symptoms after working with survivors.

Kids, 100,000 of whom are estimated to have been directly affected by the explosion, were also reported to have been significantly affected by the explosions, with more than half of those surveyed in a post-explosion UNICEF survey displaying signs of trauma. Indeed, child specialists in Beirut have observed symptoms of post-traumatic stress disorder in young children, such as involuntary urination and social withdrawal. According to Dima Wehbi, policy advisor with the International Rescue Committee (IRC) in Lebanon, the explosion has had a particularly devastating effect on children and youth (Al Tahrir, 2021).

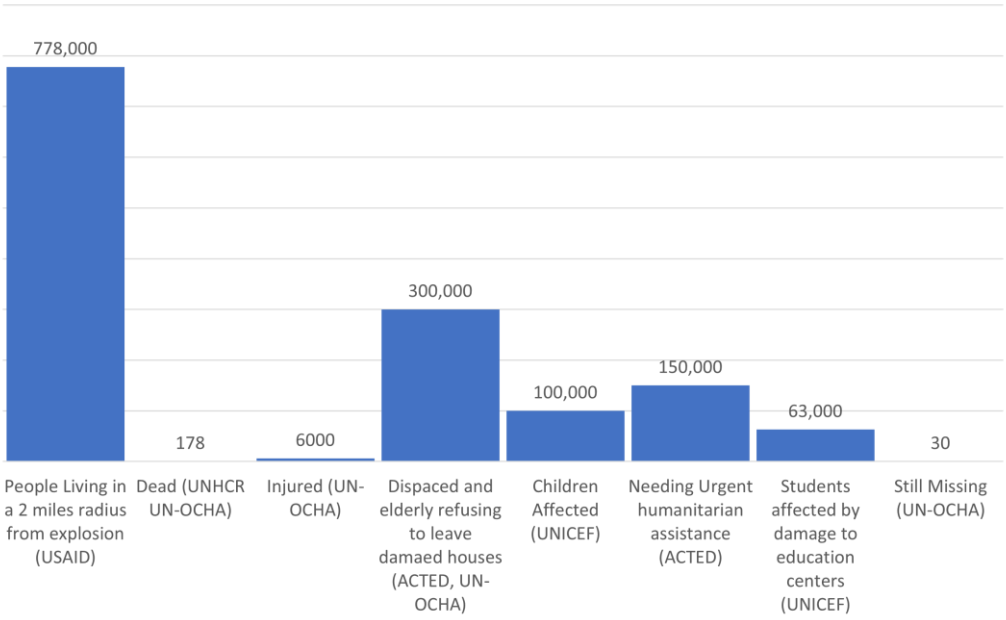

Figure 5 Affected People (Booz & Company, 2020) – Graphics Managed by Author

"*First, on psychosocial support, which is a major programmatic priority: In a rapid needs assessment conducted by UNICEF and partners, which took place between 10 and 17 August, half of respondents reported that children in their households were showing changes in behavior or signs of trauma or extreme stress following the explosions. These behaviors and symptoms can include severe anxiety; quietness or withdrawing from parents and families; nightmares*

and trouble sleeping; and aggressive behavior. One-third of households also reported negative symptoms among adults.

It is clear the needs are immense. Many children will require urgent and sustained psychosocial support to address the trauma of the explosion. UNICEF's psychosocial support comes in the form of psychosocial kits for children and parents; setting up child-friendly spaces in affected areas; and the provision of more specialized, intensive, and longer-term support for those who need it." – (UNICEF, 2020)

Few days after the explosion, there were many broader issues that were not addressed, such as:

a) An estimated 5% of affected buildings have been disconnected from the main water network. Households continue to lack clean water due to damage to the connections between water sources and buildings, as well as within buildings.
b) Waste management services are limited and inefficient, raising the risk of water-borne diseases.
c) Six major hospitals and 20 clinics suffered partial or heavy structural damage, dropping collective health capacity by 500 hospital beds; the Ministry of Education and Higher Education reports that 159 public and private schools, as well as 20 Technical and Vocational schools, serving 50,000 children and young people, suffered minor to significant damage.

The blast has also re-traumatized most of the Beirut's refugee population, which is estimated to number over 1.5 million people. Nearly 60% of Syrian refugees were reported to have lost their jobs during the lockdown in the months preceding the blast, and estimates show that the percentage of refugees living below the poverty line increased from 60-65 percent prior to the blast to nearly 90-95 percent. Palestinian refugees living in the Beirut area face high poverty rates and limited employment opportunities. Pressures on refugee populations in Beirut have only increased since the explosion, with rising anti-refugee sentiments and mounting resentment from Lebanon's host community and politicians.

3.3 Economic Impact

Since mid-October 2019, Lebanon has been hit by a series of compound shocks, including civil instability, financial turmoil, and the COVID-19 epidemic. The social and economic settings of the population and refugees in the country have deteriorated because of these shocks.

The explosion at Beirut's port aggravated the country's socioeconomic plight.

WFP had predicted a rise in the number of Lebanese and refugees in need of help to maintain their lives and livelihoods by the end of 2020 before August. WFP conducted many remote surveys in this regard during the early stages of COVID-19 dissemination to measure food insecurity among Lebanese and refugees. According to the findings, the pandemic and related containment measures have forced nearly one in every three Lebanese into unemployment, while one fifth of the population has seen their wage decreased. This was reflected in the fear of not having enough food to eat, with 50% of Lebanese, 63 percent of Palestinians, and 75% of Syrians concerned they wouldn't be able to eat.

The economic crisis has had the most significant (and long-lasting) negative impact of the three. According to the 2021 Lebanon Economic Monitor, Lebanon's economic and financial crisis is likely to rank among the top ten, if not the top three, most severe crises episodes worldwide since the mid-nineteenth century. Indeed, Lebanon's GDP fell from around US$55 billion in 2018 to a projected US$20.5 billion in 2021, with GDP per capita falling by 37.1 percent. A brutal contraction like this is typically associated with conflicts or wars.

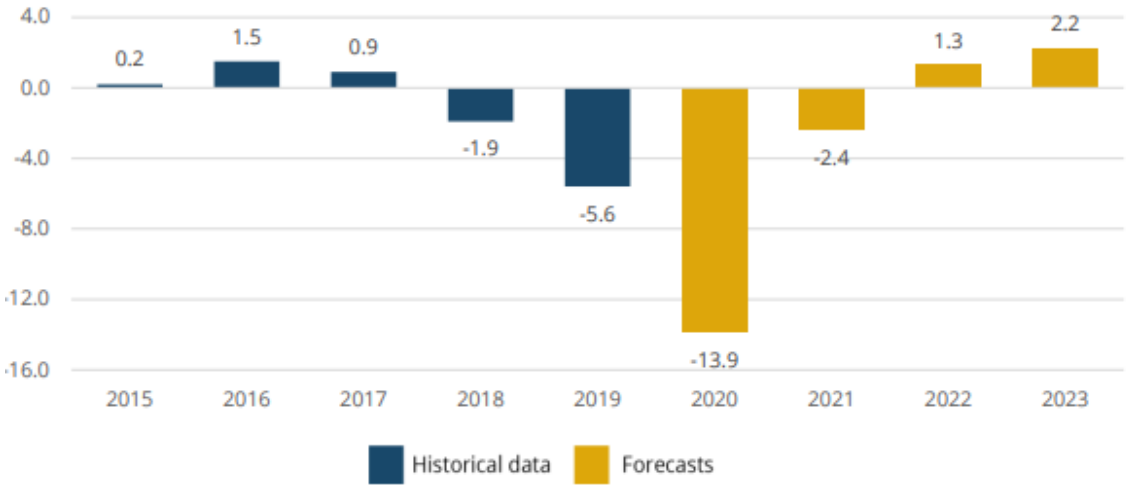

Figure 6 GDP Annual variation 2015-2023 (WFP, 2020)

The estimated 4.6-billion-dollar damage did not stop with houses. In addition to the port, more than 120 schools, six hospitals, 22 healthcare facilities, as well as several landmarks and cultural heritage sites, suffered varying degrees of destruction. (Fig.6.) With an estimated $300 million in annual revenue, the Port of Beirut is critical for importing essential goods and one of Lebanon's most lucrative sources of income. Such losses will be difficult for this country's already failing economy, complicating the recovery process. (Fig.7.)

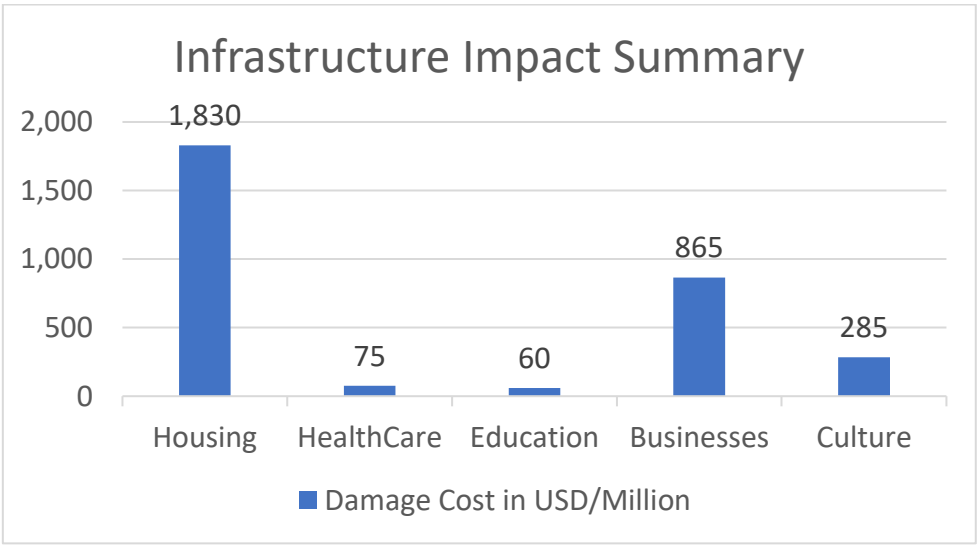

Figure 7 Affected Sectors (BOOZ & COMPANY, 2020) – Graphics managed by author

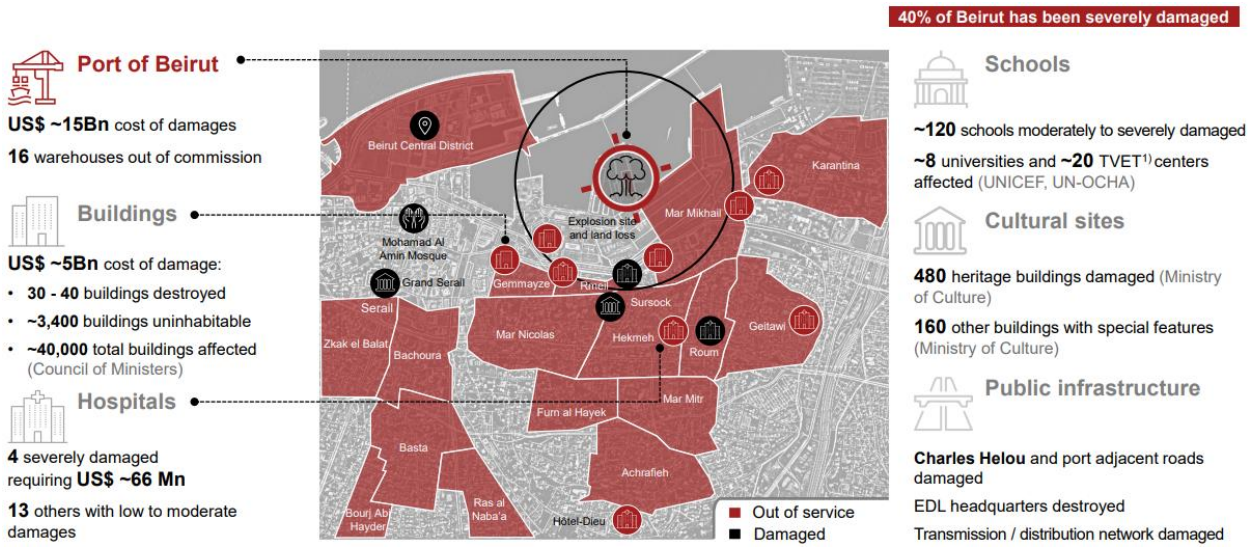

Figure 8 Infrastructure Damage (BOOZ & COMPANY, 2020)

Furthermore, the port warehouse, which housed medical supplies and personal protective equipment (PPEs), was destroyed. According to Human Rights Watch, while the world is dealing with PPE shortages, Lebanon is dealing with additional shortages because of its severe economic crisis and devaluation of the country's currency. Given the ongoing COVID-19 pandemic and the critical need for these supplies, the port closures expose the country's vulnerable healthcare sector even further. Numerous efforts and organizations from all over the world with various forms of humanitarian aid are working together to rebuild Beirut for the eighth time. The national and international communities have banded together to try to save the country's failing economic and resource-constrained healthcare sectors. As a result, effective coordination is now critical to properly match the needs of people in dire need and avert a humanitarian crisis.

3.3.1. Cost estimation of losses due to the explosion

The World Bank Group (WBG), in collaboration with the United Nations (UN) and the European Union (EU), conducted a Rapid Damage and Needs Assessment (RDNA) in close collaboration with Lebanese ministries, civil society organizations, and other key stakeholders to help guide the urgently needed global response.

According to preliminary RDNA estimates, the explosion caused between US$3.8 and US$4.6 billion in physical stock damage, while losses including changes in economic flows because of the decline in economic sector output are estimated to be between US$2.9 and US$3.5 billion. Housing, transportation, tangible and intangible cultural assets are the most severely impacted sectors.

The public sector's reconstruction and recovery needs for this year and next are estimated to be between US$1.8 and US$2.2 billion, with an immediate need of between US$605 and US$760 million until December 2020, and a short-term need of between US$1.18 and US$1.46 billion in 2021. The transportation sector has the greatest need, followed by culture and housing.

The three economic effects of the explosion are: reductions in economic activity caused by the destruction of physical capital; trade disruptions; and reductions in government fiscal revenues. Even before the explosion, Lebanon was facing a series of crises, including pre-explosion projections of 2020 real GDP growth in the negative double digits, driven by spillovers from the Syria conflict, in which Lebanon continues to host the world's largest refugee per capita population; a financial and economic crisis that included an impaired financial sector, a currency crisis, extremely high inflation rates, a defaulting public sector, and the effects of the COV. The disaster will not only exacerbate the economic contraction, but will also degrade poverty rates, which were already at 45 percent of the population prior to the explosion. (World Bank, 2020).

3.3.2. Food Security

Moreover, the blast severely damaged the port's main grain silos, which housed more than 80% of Lebanon's imported grains. With only 10% of Lebanon's grain consumption coming from domestic production, the country's food security is jeopardized. According to the United Nations Economic and Social Commission for West Asia's most recent report, nearly half of the Lebanese population is concerned about their ability to obtain enough food. Approximately one-third of the population reported being unable to consume nutritious food options throughout the year. With the recent explosion losses, these figures are expected to rise even further.

Following the outbreak of public unrest in Lebanon, an inflation rate of 56% was recorded between September 2019 and April 2020. Preliminary findings revealed that the cost of the food basket increased by nearly 50% between mid-March and the last week of May, owing to the impact of previous economic and financial

disruptions as well as COVID-19 containment measures. The cost of the food basket, which includes eight items from the Survival Minimum Expenditure Basket (SMEB)[1], has risen steadily over time. When the current price of the SMEB food component was compared to the price in September 2019, it revealed a cumulative inflation of 109 percent.

People were questioned if they had been able to hoard food owing to the national emergency and containment measures to capture the shift in shopping behavior (Fig. 10). Many people said they couldn't afford to stockpile food because they couldn't afford it. It was clear that the observed price rise had a negative influence on households' ability to get food. Only 30% of Lebanese respondents said they had food on hand, the highest percentage of any population group. (World Food Programme, June 2020)

The proportion of Syrian respondents unable to stockpile food owing to budget pressures was found to be the greatest among all population categories. Others stated that they did not do so since prices are continuously changing, and that food stockpiling is useless. This is owing to the Lebanese Pound's fast depreciation on the illicit market from mid-October 2019. Even though the Lebanese pound is tied to the US dollar, it has lost almost 62 percent[2] of its value on the black market, resulting in sharp rising costs. Because Lebanon relies largely on food imports to meet its domestic needs, food costs are intimately connected to exchange rate fluctuations.

Only 13% of Syrians said they had food stockpiled because of the pandemic, the lowest of the three population groups. Only 23% of Palestinians had emergency food supplies.

[1] The SMEB food basket is based on a monthly ration per person of 6 kg of rice, 3.9 kg of bulgur, 1.5 kg of pasta, 1.5 kg of white beans, 1.5 kg of sugar, 0.9 liters of sunflower oil, 0.3 kg of salt and 1.2 kg of canned meat.

[2] https://lirarate.org/

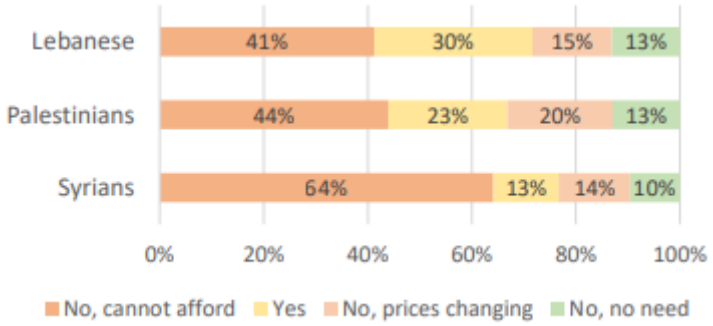

Figure 9 Stockpiling food due to Covid 19

People were then asked how long they thought their food supplies would last (Fig.10), with the majority claiming to have less than a week's worth of supplies. Syrian refugees reported that their food supplies would last them the least amount of time of any group.

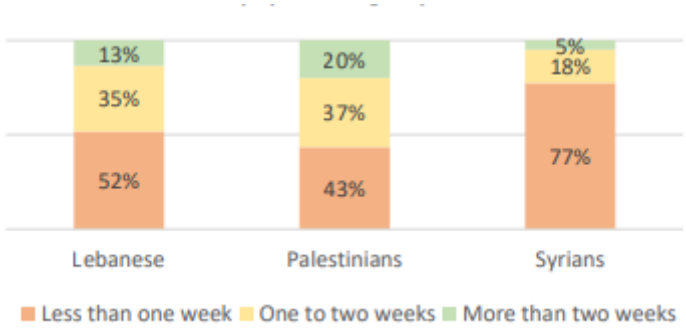

Figure 10 Duration of food stocks reported by population groups

The economic slump, high inflation, COVID-19, and, eventually, the Beirut explosion have pushed Lebanon's most vulnerable groups – including Syrian refugees – to breaking point, with thousands of families sliding further into poverty and vulnerability. The increase in the number of households living in severe poverty, which reached a stunning 89 percent in 2020, up from 55 percent only a year before, is one of the most worrying signs of the impact of the compounded crisis Syrian refugees have been confronting in Lebanon. They currently survive on less than LBP 308,728 a month per person, which is less than half of Lebanon's minimum wage (WFP, 2020).

Mireille Girard, UNHCR Representative in Lebanon, said: “The consecutive crises have affected all communities in Lebanon – Lebanese, refugees, migrants, and others – and the most vulnerable are the hardest hit. The situation of Syrian refugees in Lebanon has been deteriorating for years, but the findings of this year’s survey are a dramatic indication of how difficult it has become for them to make it through another day.” She added: “The key findings are released at a time when Syrian refugees are facing their hardest winter yet in Lebanon, braving the weather elements with very little to stay warm and safe.” (WFP, 2020)

Figure 11 shows that Syrian refugees have the least food resources, with half of Syrian refugee households questioned suffering from food insecurity, compared to 28% at the same time last year.

Households with poor diets have doubled in the last year (from 25% in 2019 to 49% in 2020), and the number of people using harmful food coping techniques like limiting the number of meals per day or cutting food quantities has also increased.

Respondents from various population groups in Lebanon were asked about the number of meals consumed the previous day prior to and during Ramadan (23 April to 23 May 2020). According to pre-Ramadan responses, a bigger share of Syrian refugees ate only one meal than other groups. These alarming results for Syrians persisted during Ramadan, indicating that they were already on the verge of starvation prior to the fasting month and couldn't afford to eat any more.

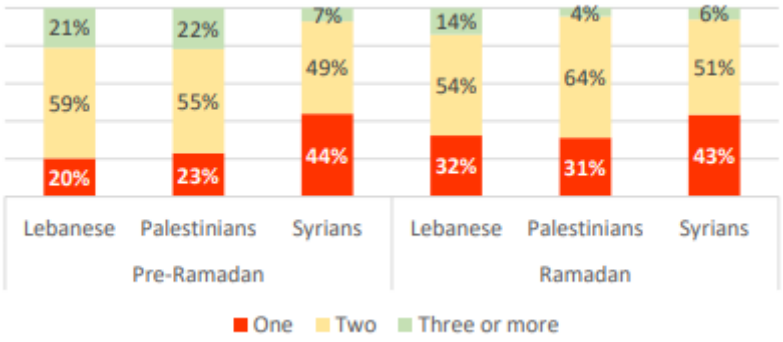

Figure 11 Number of meals consumed per day

The level of food security varied depending on the respondents' major criteria. The variances are summarized in Figure 12. According to the survey done by World Food Programme, bigger Lebanese families with eight or more members are more concerned about food insecurity than smaller families. They also employ more severe food coping mechanisms and restrict their food intake, most likely to prioritize younger children. Furthermore, the work situation of Lebanese heads of households is a significant variable, with unemployed heads of

households being more concerned and employing extreme food coping mechanisms than those who remain employed.

In addition, there were noticeable differences between families with at least one dependent and those without. Families with at least one youngster and at least one senior person reported compromising their food consumption and employing severe coping mechanisms more frequently. Families with at least one member suffering from a chronic illness or disability were found to be in the same boat. These are the primary groups that need special attention because they are more vulnerable to food insecurity.

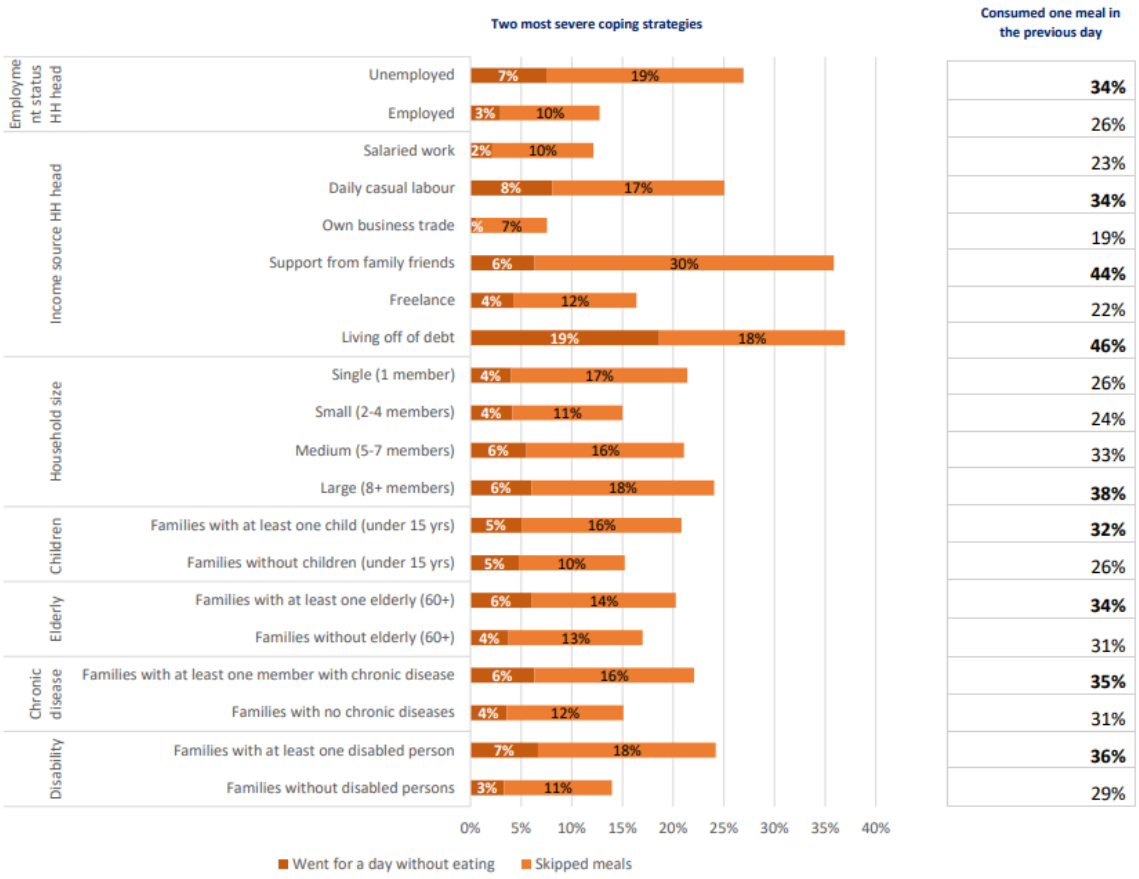

Figure 12 Food based coping and food consumption by Lebanese households (World Food Programme, 2020)

3.4 Urban Impact

In a situation reminiscent of the post-civil war period, and while residents of Beirut and its suburbs are still traumatized by the loss of their homes, shops, neighborhoods, and loved ones, the numerous proposals for the reconstruction of

Beirut's port that have begun to flow in recent weeks may provide the first signs of hope.

Among the many expressions of interest in this reconstruction process by various international actors – whether private companies, such as the French maritime transport giant CMA-CGM (directed by Franco-Lebanese Rodolphe Saadé), or governments, such as China or Russia – the most well-known proposal to date is that submitted to the Lebanese authorities by four German companies (Hamburg Port Consulting, Colliers International, Fraunhofer Institute and Roland Berger). This multibillion-dollar initiative, which was unveiled at a press conference on April 9, intends to reconstruct and enhance Beirut's port and neighboring areas.

The proposed plan intends to build a high-end port that would return Beirut to its traditional role as a gateway to other Lebanese provinces. It intends to relocate the port to the east, with the storage area being relocated from the city center to the industrial area nearby the Beirut River (currently occupied by the Bourj Hammoud landfill) and the main port access point being relocated from the city center to the Beirut River's eastern bank. The proposal includes calls for the development of multiple skyscrapers facing the sea, as well as major tourist-oriented structures. The money spent in these facilities, according to its advocates, would be utilized to fund other public infrastructures, such as park trees, sports facilities, nurseries, and schools.

The Beirut Urban Lab produced fast analyses of six districts that were seriously affected by the Beirut Port explosion on August 4, 2020, as part of its help for the Beirut Blast recovery efforts: Karantina, Mar Mikhael, Geitawi, Badawi, Bachoura, and Karm el-Zeitoun are just a few of the names that come to mind. (Fig.13)

Each of the six Urban Snapshots situates the explosion's consequences amid the larger urban dynamics that have shaped the studied neighborhood over the last three decades. It accomplishes this by offering preliminary urban documentation and analysis of neighborhood conditions, which includes a historical overview, insights into contextual urban trends, profiles of significant stakeholders, and a brief examination of socio-spatial conditions.

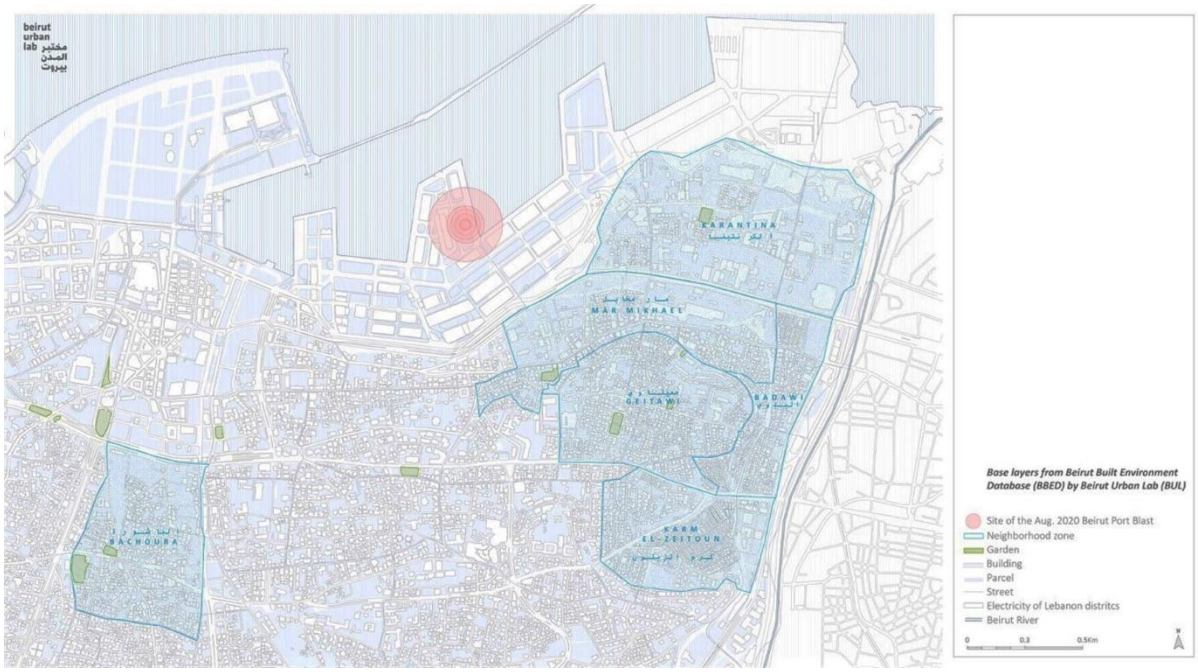

Figure 13 Map showing zone limits in all neighborhoods. (Source: Beirut Urban Lab, 2020)

The Beirut Urban Lab has listed the historical landmarks in Beirut that have been impacted by the blast. (Fig 14)

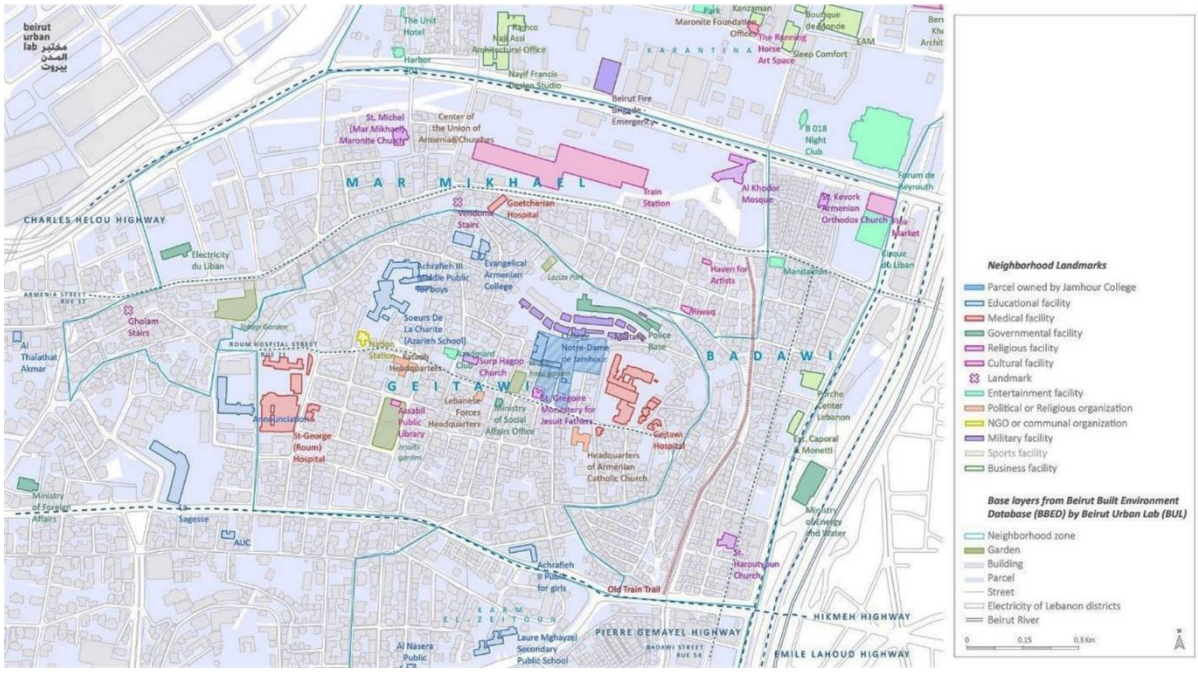

Figure 14 Neighborhood landmarks in Mar Mikhael, Geitawi, and Badawi. (Source: Beirut Urban Lab, 2020)

Theoretical Suggestions on rebuilding the Port

It will be necessary to rebuild institutions and governance structures in addition to repairing and reconstructing damaged buildings and infrastructure as part of reconstruction efforts. For instance, the report urges that the port be rebuilt holistically and today's standards, with better site and sizing, and run by the most effective and open procedures, in addition to the urgent repairs necessary to ensure Lebanon's vital imports.

The RDNA proposes a "Building Back Better" strategy based on a Reform, Recovery, and Reconstruction framework that combines structural reforms pertaining to macroeconomic stabilization, governance, the business environment, and ensuring human security with interventions that prioritize the needs of the people, particularly the poor and most vulnerable. These changes are meant to stop corruption and elite entrapment.

International assistance and private investment will be essential for Lebanon's long-term recovery and reconstruction due to its insolvency and lack of adequate foreign exchange reserves. For Lebanon to be able to access international development aid as well as external and private sector financing sources, a credible reform agenda must be put into action.

In order to rebuild a better Lebanon that puts the needs of its people first, the World Bank, the United Nations, and the European Union are fully committed to working with Lebanon and its people.

4. Governmental and Private Institutions Roles

In this chapter, the author will examine the key activities and participations offered for Beirut and discuss the significance of the private institution's role in the post-explosion management and reconstruction process. On the other side, after the shock and anguish produced by the Beirut explosion, the Lebanese citizens took control and stood hand in hand. They all assisted in saving each other and helping to transport the injured to hospitals. The author will highlight in this chapter the government's negligence during this calamity.

4.1 Institutions involved in post explosion management

After the explosion people within civil society came out in immense numbers, clearing up rubble, helping people in need of assistance and starting to assess what damage had been done to people's homes. Some people were affiliated with local NGOs and one of the local NGOs that took to the streets quickly was the NGO Offre Joie. (Fawaz Harb, 2020) (Mirshad, 2020). "*Identifying generally as non-political, humanitarian, and development oriented, professional NGOs in Lebanon have a dominant presence in the devastated districts. The breakdown of the Lebanese state throughout the years of civil war had allowed for the development of capable NGOs, many of which are local, to support some of the essential aspects of social life*". (Fawaz Harb, 2020)

Observers commented on the increasingly dire situation of refugees in Lebanon after the explosion and the breakout of COVID-19 in early November, when a Syrian male with refugee status set himself on fire in front of the UNHCR office in Beirut (INFOMIGRANTS, 2020). In fact, many refugees are choosing to return home. As of December 31, 2020, a total of 38,233 registered Syrian refugees had returned to Syria from Lebanon, a nearly 500 percent increase from the previous reported number of 6,595 returns on July 31, 2020, just days before the Beirut explosion. The overall situation in Lebanon remains difficult for most refugees, with some believing that their lives are a "misery" and that they are a "burden" on their families.

At the time, the Lebanese government was not providing any assistance to citizens. In addition to the organizations and non-governmental organizations (NGOs) and the Lebanese Red Cross, it was the citizens of Lebanon who took to the streets and attempted to rescue one another.

Although Lebanese citizens and NGO staff have dealt with their fair share of crises and extreme conditions, the August 4 explosion was truly unprecedented. Beirut's landscape and history were forever altered in a matter of seconds. They have been actively responding to the aftermath of the explosion since it occurred. Because of the physical destruction to residential buildings, many Beirut families were forced to escape their homes to stay with families or find temporary housing elsewhere. Others were forced to remain in their damaged homes.

Anera's, a non-profit organization based in the United States, and many other organizations' initial goal was to restore people's homes to at least their original condition, and in some cases, to improve them. In all home repairs, we adhere to the minimum standards established by the UN's Shelter Working Group, such as

installing dependable plumbing systems, doors for privacy, an electrical outlet in each room, and so on. This means that for many of the families, the repairs will raise their standard of living above what it was before the explosion.

Anera has renewed 500 homes and 80 shops since the days immediately following the blast. As shown in Fig. 15, NGOs such as Anera, Development for People and Nature Association (DPNA), Norwegian Refugee Council (NRC),

ACTED, and others were tasked with rehabilitating damaged residential urban areas in Beirut.

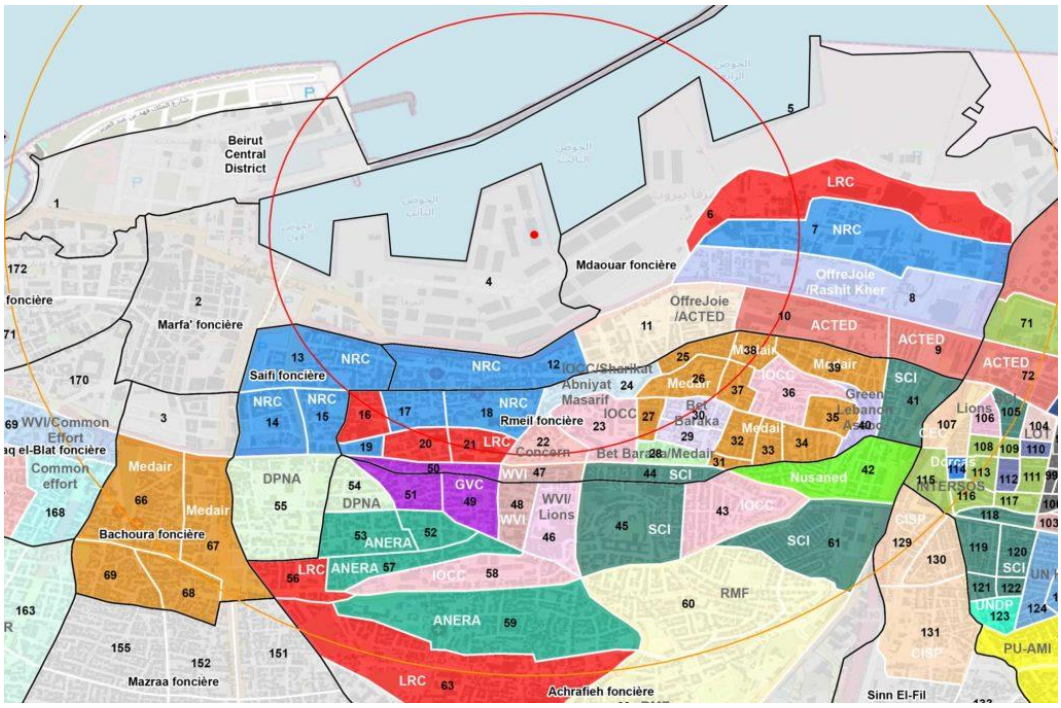

Figure 15 UN Interagency Coordination map for home repair in Beirut (Anera, 2021)

Many NGOs and charities have contributed to Beirut's disaster relief efforts. Here are some of the most noteworthy, along with links to their websites for individuals interested in volunteering or giving.

1. **FoodBlessed** is a Lebanese hunger relief organization organized by a group of volunteers who are passionate about fighting hunger in Lebanon. During the Beirut disaster, which destroyed numerous houses and

displaced hundreds of thousands of people, FoodBlessed has been boosting its efforts.

2. **The Lebanese Food Bank** is a non-profit organization that has sent food packages to thousands of households in Lebanon. And their efforts did not cease following the horrific events in Beirut. Instead, they've been able to offer food packages and surgical masks to people in and out of Beirut in order to protect them from the continuing coronavirus outbreak.

3. **Lebanon 2.0** is a group of young and vibrant Lebanese who are working to make Lebanon a better and stronger place. They've been cooking daily meals and distributing them to thousands of individuals in dozens of places around Beirut, including first responders, medical staff, and on-the-ground volunteers.

4. **Kheir**: When product costs skyrocketed early this year, a group of women founded this charity. They've fed over 250 families so far, and following the Beirut bombing, they'll be feeding even more.

5. Smile & Olive (**Basmeh & Zeitooneh**) is a sign of happiness, serenity, and sustenance. It has been supplying basic food supplies to those persons who have been affected by the incident.

6. Since 2012, the **URDA** has been assisting the unfortunate Lebanese. People need assistance today more than ever following the financial crisis and the Beirut blast. The URDA is assisting thousands of households in the aftermath of the tragedy by giving water, food, hygiene, and other essential items.

7. Most Beautiful Mess, also known as **Ahla Fawda**, is a Lebanese NGO that aims to bring joy throughout Lebanon and is run by young volunteers. Now, the nonprofit is bringing happiness to Beirut residents by cleaning and restoring their houses.

8. **The Lebanese Red Cross**: The charity works around the clock to help individuals in need during the coronavirus epidemic and now the Beirut explosion. They've been able to support over 6,000 families affected thanks to a recent international donation to the charity.

Donation Type	Quantity
Water bottles	12,000
Hot Meals	1250
Food Parcels	120
Streets Cleaned	30+
Houses Cleaned	50+

Figure 16 Donations by Basmeh & Zeitooneh (Instagram post, August 2020)

4.2 The Role of Private Sectors

Is it feasible to establish a functioning society in which the government and NGOs collaborate to fulfill complementary roles, where both are welcomed, and the end product is functional? *"Functional prerequisites refer broadly to the things that must get done in any society if it is to continue as a going concern, i.e., the generalized conditions necessary for the maintenance of the system concerned. The specific structural arrangements for meeting the functional prerequisites differ, of course, from one society to an- other and, in the course of time, change in any given society"* (Aberle, Cohen, Davis, Levy, Sutton, 1950, 100). A functioning society would never have allowed such dangerous AN storage in such a densely populated region in the first place. So, while an NGO can play a significant role in post-disaster aid, it cannot possibly replace a government in the preventative phase.

Professor Christoffer Spencer Lammer-Heindel argues in his PHD thesis*: "**Does the state have moral duties?"*** State duty-claims and the possibility of institutionally held ethical obligations at University of Iowa that states and other institutional organizations are commonly attributed both moral duties and obligations. He explains that it is widely held that the state has *"a moral duty to protect its citizens from external threats and (more contentiously) it is claimed that it ought to positively promote the welfare of its members."* (Lammer-Heindel, 2012, 1). He goes on to state that *"it is argued that at least some institutional organizations are moral agents in their own right which have duties and*

obligations that are uniquely their own. According to this antireductive holist approach, at least some institutional duty-claims resist being analyzed into claims about individuals' duties and obligations" (Lammer-Heindel, 2012, 1)

Lester M. Salamon and Helmut K. Anheier argues in their article ***Social Origins of Civil Society: Explaining the Non-profit Sector Cross-Nationally*** *that "the market failure/government failure theory would lead us to expect that the non-profit sector would be funded mostly out of private charitable contributions. This is so because this theory views the non-profit sector as emerging from demands for public goods not being met by either the market or the state. Under these circumstances, there would be no reason to expect the - 16 - resulting non-profit organizations to be financed either through market transactions or governmental subsidies. To the contrary, to the extent such demands are satisfied beyond the realms of either government or the market, the most likely source of support is voluntary contributions."* (Salamon, Anheier 1998, 221).

Is there any function, such as disaster relief, that should be handled by the government rather than an NGO? Was the government's functioning even more obviously missing in the run-up to the Beirut harbour explosion than in the aftermath?

When discussing the case of CSOs responsibilities in Lebanon in her article ***Analysing State–Civil Society Associations Relationship: The Case of Lebanon,*** Tania Haddad states that *"...civil society reacting to the paralysis of the government institutions and state failure, developed to fill the space left empty by the retreating state. These in return, became very strong players in the society masking the role of the state."* (Haddad, 2016: 1752).

Haddad also adds that *"In the total absence of the state, the lines separating the state and civil society becomes blurry"* and that the role civil society plays is *"...directly linked to level of democracy and the legal framework governing associations in the state… With the absence of the rule of state, civil society adapts to the situation and step into fill the gap."* (Haddad, 2016: 1752-53).

Following the tragedy, an army of volunteers from different parts of Lebanon took it upon themselves to clear the streets and apartment buildings of debris and shattered glass with the aid of various organizations.

Hundreds of online fundraisers were organized to benefit the victims of the explosion, some of which were launched by celebrities, such as Rima Fakih, a former Miss USA of Lebanese origin, and her husband, who raised $1.2 million in just 10 days. The funds were mostly given to well-known and long-established organizations, such as the Lebanese Red Cross or Offrejoie (Joy of Living), which

received $28 million and $8.5 million, respectively. A portion of the funds were distributed to organizations that emerged at the start of the economic crisis and proved their worth, such as Beit el-Baraka and Nusaned, which each received nearly $4 million.

The diaspora-created online platforms Seal, Life, and Impact Lebanon raised a total of more than $18 million.

On social media, internet links containing the names of trustworthy organizations were shared, directing Lebanese who were living abroad and wanted to assist with the relief effort. In contrast to Lebanon's estimated six million Lebanese citizens, the Lebanese diaspora is thought to consist of eight million people.

Grassroots initiatives, such as Basecamp and Nation Station, were also launched by local citizens who transformed into true humanitarian workers, gaining trust, and attracting donations.

Everything was done to avoid state institutions and a political ruling class that was deemed corrupt and incompetent and was blamed for the port explosion.

PRIVATE ACTORS AND STATE AID	DONATIONS COLLECTED IN MILLION $
The Lebanese Red Cross	28
SEAL/LIFE AND IMPACT	18+
OFFRE JOIE	8.5
NUSANED	4
BEIT AL BARAKA	4
RIMA FAKIH	1.2
THE STATE	5

Figure 17 Financial aid raised in the aftermath – Graphics managed by the author

4.3 The institutions involved in the reconstruction process

Beirut would currently be a deserted ghost city if it weren't for the NGOs and the thousands of people who rushed to help and who continue to do so voluntarily after the explosion at the Beirut port, which destroyed half of the Lebanese capital and left hundreds of thousands of people stranded.

They have been on the ground since August 4th, sheltering, feeding, cleaning up the rubbles, mending homes, supplying supplies, reconstructing, and extending spiritual and emotional support.

People have been managing the disaster to the best of their limited skills, whether through individual initiatives or NGOs' teams, and they have accomplished a great deal.

Throughout the absence of formal government activity, Tamanna and many other NGOs have been repairing and remodeling houses and businesses in the city for the past two months. The city was cataloged into damage zones, and a coalition of local NGOs was assembled to begin the rebuilding process.

The explosion of 2,750 tons of ammonium nitrate resulted in the relocation of 300,000 people, at least 190 deaths, thousands of injuries, and the annihilation of half of the capital. In Greater Beirut alone, 67 percent of businesses were affected. According to the Syndicate of Owners of Restaurants, Cafes, Nightclubs, and Patisseries, 100% of businesses in the districts of Ashrafieh, Gemmayzeh, Mar Mikhael, and Saifi were affected.

Tamanna found themselves in unfamiliar ground, from repainting to installing new windows and doors to purchasing furniture and electrical things. Soraya Barbir, the NGO's executive director, told The Daily Star that being a small company had advantages over giant enterprises that are plagued by bureaucratic processes. "*All we had to do was pick up the hammer and get to work"* Barbir stated.

Tamanna requested foreign donations to begin repairs on destroyed property, but according to Barbir, they have yet to receive any. "*We heard that glass, wood, and metal were being donated from other countries*" Barbir added. Egypt and the United Arab Emirates are alleged to have contributed, but "*we did not see anything from anyone*" according to Barbir. (AlBawaba, 2020)

For assistance, the NGO resorted to local vendors and private efforts. Glass for five dwellings was given by a Lebanese manufacturer. Tamanna has also made hiring Lebanese employees a priority in order to assist the community in overcoming the economic crisis. "*Even our painters, we hired retired painters to assist because it is a source of income for them*." "*We made it a point to hire Lebanese people*" Barbir explained.

Local suppliers have been courteous despite the spike in demand for goods like as glass and aluminum. Despite inflation and increasing demand, Barbir's team

was able to get material at a fair price. Tamanna concentrates on the inside of a property after the façade has been restored.

In this area, the group has had to work with other local NGOs for assistance. Tamanna teamed up with Min Beib La Beib, a furniture recycling company, to assist equip flats. Min Beib La Bieb was swamped with a supply of furniture that well surpassed demand because to the generosity of Lebanese and foreign contributors.

Amid a pandemic and the country's greatest economic crisis since the Civil War, there has been no formal government response or governmental help to the disaster. NGOs have obviously had difficulties in terms of fundraising and buying power as a result of this.

Many devastated homes were reconstructed because to the kindness of donors and international assistance. Dafa received 4,000 mattresses from benefactors in Lebanon and worldwide, including the United Kingdom and Malta. Hundreds of goods were also donated by companies such as Whirlpool, a home appliance maker, and Kitwood, a kitchen manufacturer.

But can Beirut be restored just by NGOs? "*No, we won't be able to restore anything with NGOs, even the port.*" "*There are massive projects that we can't handle*" Yacoubian remarked.

She stated her desire for a government that works. She replied, "*I'm not sure anyone trusts those [politicians]*." Yacoubian, on the other hand, feels that the government's participation in the city's reconstruction is feasible, noting the three-month repair of Beirut's extensively damaged suburbs during the 2006 war with Israel as an example.

The quick response and hard work of non-governmental organizations has offered hope and assistance to the victims of the devastating bomb. Despite the progress made, Solh noted that the amount of work still has to be done, adding, "*Our path to Lebanese people waking up and having a normal situation is quite lengthy*." *It's a catastrophe*."

5. Beirut Port Proposals for reforming and rebuilding Beirut Port

5.1 University Competitions and Proposals for Beirut port

In the months following the horrifying explosion in Beirut in August 2020, a number of reconstruction plans were publicized. On the other hand, these

proposals frequently reflected out-of-date perceptions of the city and did not always take into account the interests of those who lived close to the port. Within the framework of an intercollegiate design studio project, master's level architecture students at TU Delft created new perspectives. They are currently on display in the virtual exhibition Adaptive Strategies Exhibition.

Urban transformation is the process of going from one situation to another fundamentally. It frequently comes with courageous choices that usher in a new era in a location's, neighborhood's, or city's history. These decisions can be made from on high, but in order for them to result in urban transformation, they must be accepted from below by those who will bear the risks and pay the price as they help rewrite the history of their city.

Beirut has been compared to the fabled phoenix, which has risen from the ashes of its own ashes multiple times. The following peaks and collapses of the city were willed into existence by genuine actors, not by supernatural powers, as this populist image suggests. And it was frequently done by pitting one's will against the will of someone else. In the recent decades of spirals of rebuilding, construction, and destruction in Beirut, the winners have neglected the fact that they will not be able to sustain themselves if there are too many losers in the game. Following the explosion in Beirut's Port in August 2020, the rebuilding of Beirut's port and surrounding area is at a crossroads.

The works seen here are a selection of final projects submitted by students in the master's elective Adaptive Strategies: Past, Present, Future. In Spring 2021, the chair of History of Architecture and Urban Planning at TU Delft offered this 5-credit course (weekly 2-hour session over 10 weeks).

Proposal 1:

Port for the People: A Citizen-First Vision for the Reconstruction of Karantina and the Beirut Port Cityscape

(Students: Weiyuan He, Sandra Jasionyte, Giulia Kiernan, Yinan Ni)

The project Port for the People envisions a future for Beirut in which inhabitants may appropriately benefit from the port cityscape. Rather than letting Karantina's most vulnerable populations to face the brunt of a corrupt and failing system, this idea proposes that Beirut's people be prioritized in the city's and port's rehabilitation, assuring their future well-being, prosperity, and feeling of belonging. To do this, Port for the People advises first establishing a better

physical relationship between the port and the city fabric by repurposing the port as a permeable component of the waterfront. (Fig.18 & 19)

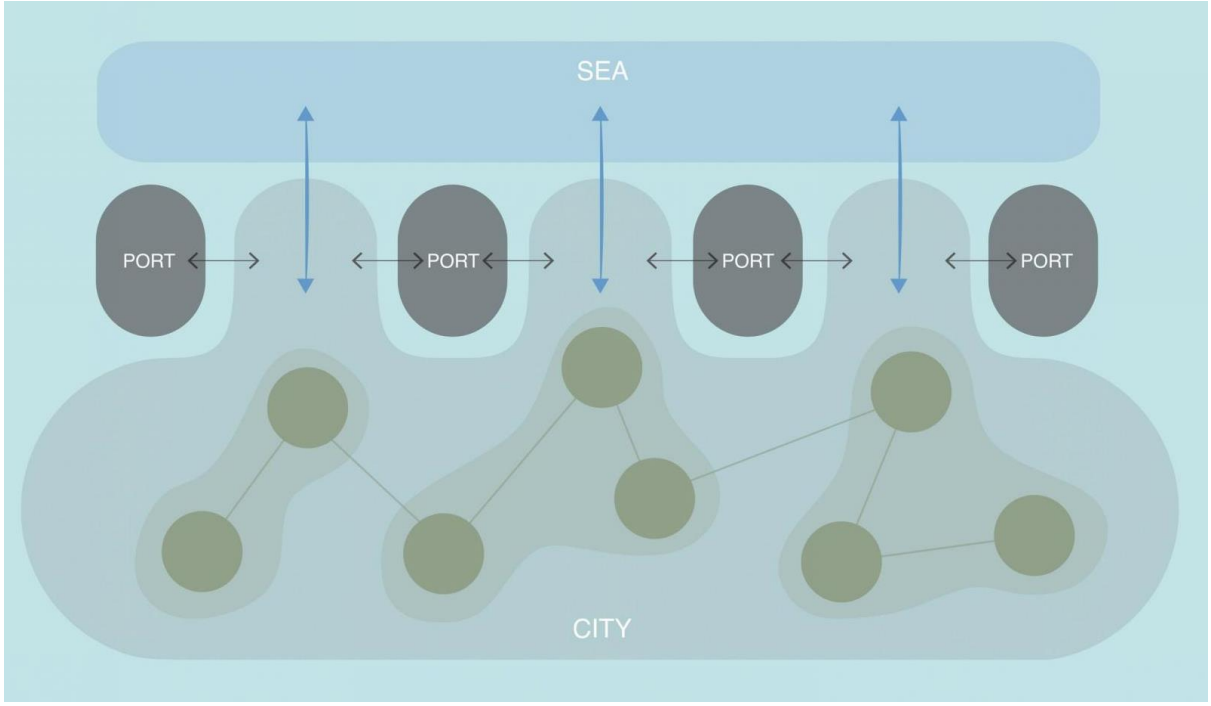

Figure 18 Main Concept (Port City Fututres,2021)

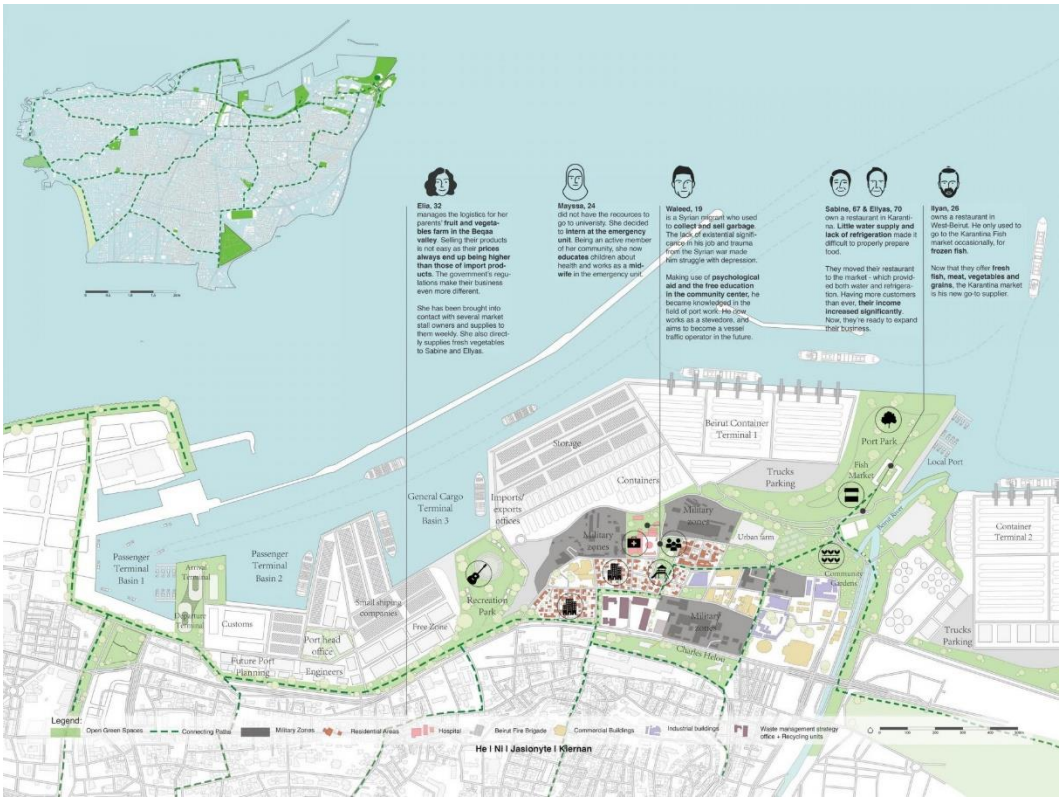

Figure 19 Masterplan Design (Port City Futures, 2021)

Rather than being a continuous, hard, and impassable barrier between the city and the sea, the port is now split up into its many services by extensions of the metropolis. New public areas, connected by a green network to enable pedestrian circulation, provide economic and humanitarian programs for inhabitants while also reinforcing Karantina's traditional character as a home for low-income Lebanese nationals, immigrants, and refugees. This idea adds to a future vision of an egalitarian Beirut, where inhabitants not only live comfortably and prosperously, but are also active participants in the port cityscape, thanks to its comprehensive approach. (Fig.19)

Figure 20 Volumetric Diagram of Proposal (Port City Futures, 2021)

Proposal 2:

Karantina with 3S’es: Sustainability, Sociality and Sentiment

(Students: Hsiu-Ju Chang, Kianu Goedemond, Laura Wiedenhöver, Georgia Xypolia)

By establishing an economic, social, and spatial infrastructure for generating and recycling sustainable materials, changing the river into a green aorta, and introducing the marketplace as a trading platform, Karantina with 3S'es aims to repurpose Karantina as a green engine of Lebanon.

The project unfolds along three interconnected paths. First, it brings to Karantina non-governmental organizations (NGOs) that recycle waste, sort it at the source and compensate those who do so and create jobs. In the makers district, where artists and galleries thrive, recycling supplies resources for sustainable creations. Methane is produced by the landfill and absorbed, lowering greenhouse gas emissions. It heats homes, fuels transportation, and generates electricity sustainably when combined with methane from paper and compost. (Fig. 21)

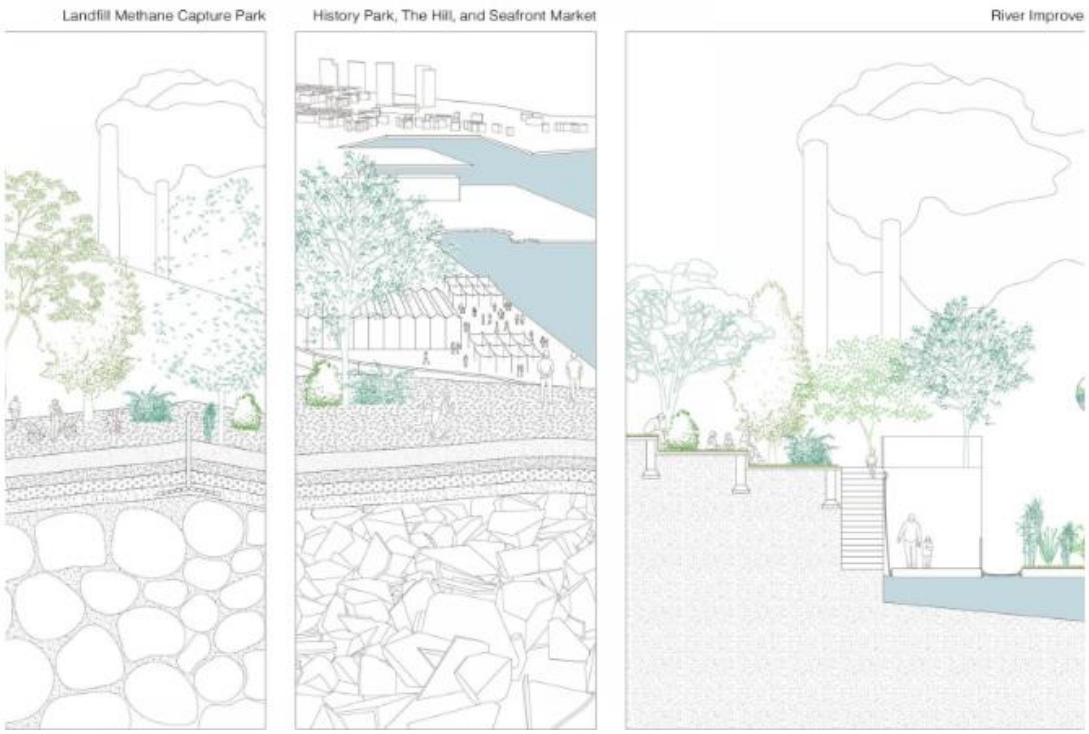

Figure 21 Methane strategy (Port City Futures, 2021)

Second, the project converts the river in Beirut into an azolla plant. Azolla consumes biological waste from upstream, cleanses the water, and keeps aquatic life thriving. Locals collect the fast-growing plants, which trap CO2 and prevent overgrowth. Azolla harvested for cattle feed and biodiesel. Pontoons line the river to harvest it, creating an additional pedestrian connection path.

The initiative also addresses the issue of mobility and safety. It proposes that heavy traffic be separated from regular traffic as well as pedestrian walkways. Transfers become better, safer, more sustainable, and socially interactive in this way. The slower spatial experience improves the social fabric's inclusiveness. This draws attention to Karantina and motivates her to improve herself. The port, the highway, and vital supplies are the only places with heavy traffic near the boundaries. (Fig 22)

Figure 22 Reconstruction Design of Beirut Port (Port City Futures, 2021)

"Our goal for Karantina is to transform the area into a prosperous neighborhood free from political corruption and failing confessional democracy. The grassroots movement transcends demographic and religious barriers. Dependency is replaced by a positive, constructive attitude. Two parks, or half of the city parks, are part of this project and draw tourists from all over, generating revenue for the leisure industry. A significant local influence and useful gateway continues to be the nearby port. Fisheries and imports give craftsmen a place to work and help the local economy. Metal and sustainable material exports cause a flow in the opposite direction to the port. As a result, Karantina offers practical steps toward a greener port that is unrestricted by inflation, poverty, and corruption," the students claimed.

Proposal 3:

Weaving Mobility: Reconnecting Karantina after the August 2020 blast

(Students: Tasos Antonopoulos, Michalis Psaras, Alice Sikiaridis, Shing Yat Tam)

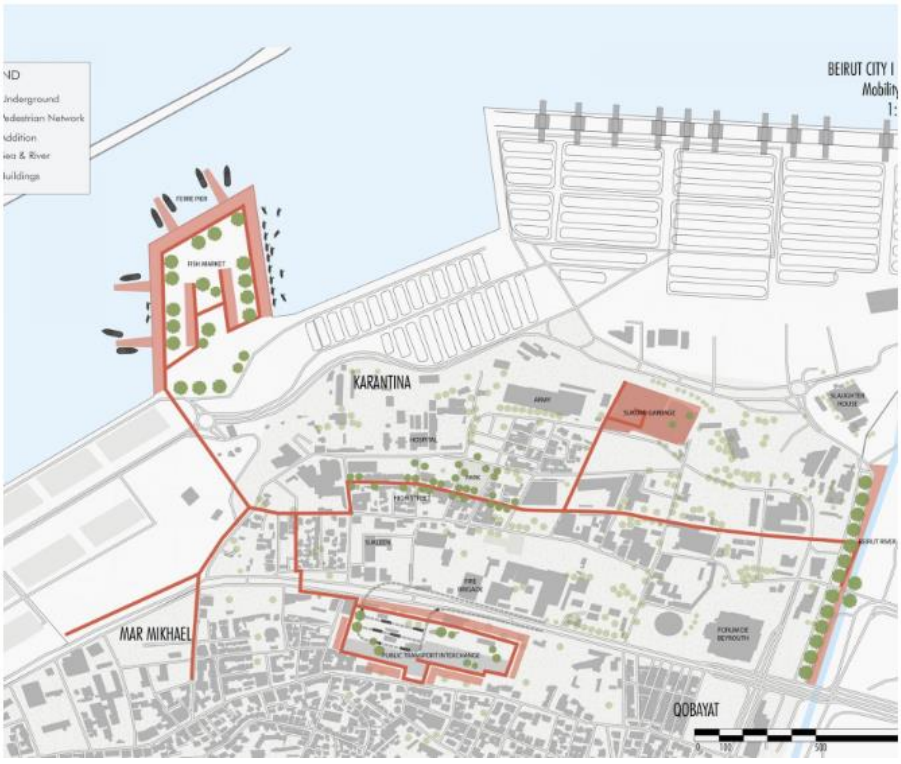

Figure 23 Unnamed (Port City Futures, 2021)

Considering Beirut's uncertain repair progress and future, this concept is not intended to be an anti-historicist urban panacea, but rather a pragmatic endeavor to embrace the existing hazards and potential in order to achieve meaningful port-city interactions. The original urban fabrics have been preserved. Improvements are suggested to be implemented in stages. The pedestrian network is the foundation of this urban gesture, a catalyst for weaving mobility and fueling the engines of restoration and regeneration, a process that will re-center Karantina in the context of Beirut's new port-city future.

Figure 24 Strategies (Port City Futures, 2021)

Figure 25 Vision Render (Port City Future, 2021)

Proposal 4:

Public and Healthy Port District

(Students: Ghassan Mosto, Scott Spoon, Bram van den Berg, Kimberly van Vliet)

By eliminating the constraints in the area, the Public and Healthy Port District aims to integrate the port and Karantina into Beirut's cityscape. The basic concept is that Karantina can be more than a solitary metropolitan city sector marked by deplorable living circumstances. Karantina can become a component of the new public and healthy port district, full of interaction and innovation with its surrounding areas with the goal of contributing to sustainability, by breaking down barriers and giving the port a new identity. District of port city the project's main features include improving urban fabric connectivity while supporting port activities and introducing new algaculture facilities. (Fig 26)

Figure 26 Unnamed (Port City Fututres, 2021)

The idea declares that the port does not exist only to produce money, but rather to assist the lives of Beirut people and give a bright future. The port is sending a statement that it is attempting to innovate itself while also improving the living environment for its residents by introducing the algae farm at one of the city's most desirable places.

Figure 27 Vision Render (Port City Futures, 2021)

5.2 World Bank Policies for Reforming and Rebuilding Lebanon's Port

5.2.1. Reforming and rebuilding Lebanon's port sector

Guiding Principles

The goal of reforming the Lebanese port industry is to create a stable and transparent environment. This means enacting the rules and regulations necessary to allow ports to:

(i) provide the most cost-effective services
(ii) contribute to national economic development

(iii) establish an enabling atmosphere for private sector investment.

All parties with an interest in the effective operation of ports, including Customs and trade facilitation, should be satisfied with this strategy.

A new independent Port Authority will be formed to reestablish confidence, concentrating on good governance and secure port operations while adding value to the Lebanese community. To that aim, several prerequisites must be met, and the budget proposal must incorporate the guiding principles described below. The public's health and safety must also be prioritized.

1. **Setting the landscape right**
    a) Developing a national strategy for ports and corridors, as well as a master plan for the Port of Beirut
    b) Passing a port law that complies to internationally recognized norms:

i. Guidelines are clearly defined:
   In a port authority, the responsibility of public port policy is formalized in a government department
   A clear separation of commercial and technical regulatory tasks.
ii. Established Governance
   Port costs are determined in a transparent manner (informed by cost accounting principles).
   A clear specification of the professional standards for a Port Manager (or General Manager, Managing Director).
   A clear explanation of the qualifications, responsibilities, and accountability of members of the Port Board(s).
iii. Accountability and Transparency
   Transparency in the selection and nomination of members of the Port Board(s), their tenure, and replacements, including nominations from both public and private sector organizations.
   Minutes of Board meetings must be made public.
   Within three months of the end of each fiscal year, the annual independent audit of port accounts is made public; within three months of the end of each fiscal year, the annual port sector report is made public, providing transparency to port operational activities and plans through the publication of Key Performance Indicators (KPIs).

2. **Managing the change**

   The implementation step must encompass investment, financial, and operational issues once the framework has been agreed upon and implemented:

   a) Basic infrastructure reconstruction requiring the upgrade of the Port of Beirut masterplan, which is dependent on a nationwide port sector strategy
   b) Developing strong management practices, relying on a cost accounting system with specified cost recovery principles and financial and operational KPIs.

3. **Supplementing the port sector reform**

   Promote institutional changes in customs and border management agencies to allow integrated digital trade and trade facilitation improvements:

   a) Supporting structural reforms in the Lebanese Customs sector and enhancing the present institutional, legislative, and regulatory environment in line with best international standards.
   b) Developing a contemporary, secure, and interoperable Maritime Single Window (MSW), NSW, and PCS platform to promote port process digitization.
   c) Promoting integrated border management at Lebanese ports with the goal of shortening clearance times for traders and logistical providers.
   d) Reengineering and standardizing the processes and procedures of the port's trade and transportation compliance authorities, as well as providing the required capacity building to enhance their results.
   e) Increasing the alignment of border agencies (including Customs) with international best practices for trade facilitation (RKC, WTO-TFA) in order to lower the time and cost of commerce via Lebanese ports.

The World Bank has addressed the four primary pillars that support the rebuilding and repair of Beirut's port as shown in Figure 28:

a) a new governance system based on the concept of the landlord port
b) Customs and trade processes that are efficient and contemporary are critical in resolving concerns of transparency and security.
c) open and transparent bidding processes
d) quality infrastructure, which is dependent on a nationwide port strategy and a revamped layout for the Beirut Port.

Figure 28 : Building blocks for the reconstruction of the PoB - Source: World Bank, 2020

5.2.2. Smart/Digitized Ports

A Smart Port is a digitized port. In a competitive perspective, "smart" means being more appealing, inventive, and intelligent. Ports connect ships and cargo to importers and exporters. They are a crucial node in the marine industries and trade's worldwide supply chain activities. Ports have evolved into full-fledged communities and ecosystems.

A Smart Port is a port that is more efficient, effective, and cost-effective. Residents are also considered a vital stakeholder in Smart Ports' activities and operations. They employ real–time data and a collaborative management approach to improve security, reduce energy consumption, and give more with less. Smart Ports are environmentally friendly, digital, and better connected to logistics, industrial environments, and resources for sustainable growth. They are fully automated ports that employ cutting-edge technology while also taking greater care of the maritime environment.

Smart Ports involve Big Data, Artificial Intelligence (AI), Internet of Things (IoT), blockchain technology, and 5G connection.

Why are Smart Ports Important?

Ships are becoming bigger, the population is expanding, ports are getting crowded, and products need to move quicker in today's worldwide economy. Vessels are expected to sail autonomously in less than ten years, therefore being

smart is no longer an option, but a must to remain competitive in the maritime industry and at capacity. The advancement of technology is critical to the improvement of neighboring cities. Because port competition is becoming increasingly fierce, making business methods and operations smarter implies making them more appealing.

The marine sector, which was formerly thought to be resistant to change, will soon embrace high-powered technology that is the way of the digitalized future. Ports must understand their industry's market, players, and stakeholders, as well as have a competitive strategy, or they will lose ground as the worldwide supply chain and marine sector evolve.

Ports are also in charge of the safety and security of their personnel and any impacted parties. The Port Harbor Master Division is responsible for preventing collisions, protecting environmental regions, preventing pollution, and ensuring worker safety. Smart Ports' technology can assist the Port Harbor Master Division in better preventing safety hazards and improving predictive analyses.

What Motivates the Use of a Smart Port?

Ports across the world will be affected by increased maritime traffic as a result of globalization. Other industries are digitizing, and ports will need to do so as well to continue operating. The globe is expanding, with more products and services being moved and more international trade taking place. There are greater environmental concerns, as well as more traffic congestion.

Smart Ports help to alleviate traffic congestion, which in turn helps to reduce pollution. Automation is used in Smart Ports to better link ports to stakeholders via autonomous ships or vehicles. Input leads to increased system efficiency, which saves time and money. Intelligent systems, transparency and sustainability, an open innovation mentality, and Big Data, Artificial Intelligence, blockchain, nonstop service, efficiency, automation, and green tech are all used in Smart Ports.

Technologies needed to achieve a Smart Port:

1. **Big Data**: For the shipping business, Big Data is a game-changing technology. The world is becoming increasingly data-driven, and ports are no exception. This is more than just a case of a high number of inputs. It enables businesses to make advantage of massive volumes of data from nontraditional sources. Time-sensitive inputs, not merely previously recorded, are a non-traditional source utilized to improve the industry and ports. Large amounts of data are now available, and the question is what can be done with it. The marine shipping sector will be transformed as a

result of Big Data's contribution to predictive technologies and estimated time of arrival systems. Sensors, for example, are now linked to vessels and provide real-time data. This data, which includes texts, audios, videos, and real-time information, is used by Big Data systems to track vessels and cargo.

2. **Artificial Intelligence**: Machine learning, or artificial intelligence, is when robots are designed to mimic and reproduce human decision-making and monitoring processes. Artificial intelligence (AI) enhances the efficiency and effectiveness of commercial processes. It may be used to make accurate port operating projections as a decision-making system. Big Data is used by Artificial Intelligence to forecast what will happen in the future global supply chain system. Artificial Intelligence also contributes to a safer working environment by minimizing driving errors and accidents, as well as improving general workplace safety.
3. **Internet of Things** (IoT): The Internet of Things (IoT) is a network of "things" that are connected by various technologies, such as sensors. IoT can, for example, determine what each ship is carrying in great detail. Port officials may use the Internet of Things to track approaching vessels in real time and maintain track of cargo. The Internet of Things facilitates decision–making based on exact data sharing.
4. **Blockchain Technology**: Data is stored using blockchain technology. Logistics firms may use blockchain technology to track every event that occurs in the global supply chain. These inputs are saved indefinitely and cannot be removed. All data may be saved online using blockchain technology, which might revolutionize the transportation industry's decision–making processes. Actors would have unchanging real-time data at their disposal. This technology provides a paperless system with an open platform.
5. **5G Network**: 5G is a network with 1000 times the capacity of 4G and better transition rates. Smart Ports need 5G to make the shift to an intelligent system. 5G allows ports to utilize more data with less power consumption, send data in real time, and rapidly and efficiently utilise information from IoT systems.

   Furthermore, there are several metal surfaces in a port. Different signals might get lost in a port before 5G. With 5G, however, wireless signals may be routed in a precise direction without being interrupted thanks to beamforming technology.

   Smart Ports are built on a foundation of Big Data, Artificial Intelligence, the Internet of Things, blockchain technology, and a 5G network.

Examples of Smart and Digitized Ports:

Port of Rotterdam:

The Port of Rotterdam thinks it has begun the world's largest digitalization initiative for a port. 40 kilometers long, this port is one of the longest in the world. The port understood that fossil fuels would be phased out in the future, and that ships will be totally automated within eight years. Even port containers (containers in which products are carried) are becoming more computerized. As an outcome, they came up with the concept of the Digital Twin. The DT of the Port of Rotterdam digitally replicates the port. The port can understand how their efforts will affect the port, the local ecology, and the shipping sector in advance this manner. This port has developed economic and social value with partners via sustainable expansion by using a Smart Port system.

The Port of Rotterdam use the technology outlined above to forecast what ports will look like in the future, even if it is 80 years away. In a soon-to-be digitalized marine business, data helps them to create precise predictions and projections, allowing them to remain competitive and efficient.

Figure 29 Smart Port of Rotterdam - Source: Port Technology 2021

Port of Quebec:

The Port of Quebec is a Smart Port that prioritizes the region, communities, and inhabitants in its Smart Port projects. They've set aside 20% of their land for tourism and leisure activities. The Port of Quebec is also taking part in a green project that will see the port and surrounding communities' plant 4,500 trees by 2022. They work together to conduct events and take part in circular economy and technical projects.

How does the Smart Port affect the city?

The rising friction between ports and their hinterlands is recognized by a Smart Port city. Residential and industrial sectors are included in these lands. Ports have environmental implications on land and water, and there is pressure from the hinterlands to make them more appealing. The increasing hinterlands, on the other hand, are putting pressure on ports. As a result, a Smart Port city reintroduces the interaction between ports and their hinterlands, as well as how they might collaborate in a symbiotic way. Fluidity is also important in a Smart Port city. The whole value chain (the activities that generate value for consumers) is dynamic and competitive. The Port of Havrein in France, for example, has a software system that allows the port to unload a ship's cargo in only a few minutes. This means that the ship docks, the cargo is unloaded, and the ship departs. This reduces congestion, saves money, and helps the environment.

A circular economy is also a feature of a Smart Port city. This is the notion that there is no such thing as waste. Because ports are various business zones, there is a new notion that one industry's trash is helpful and may be reused by another. The ports of Québec, Le Havre, and Rotterdam have begun to implement a circular economy.

The notion of a port as an energy center is also introduced in Smart Port cities. This is the concept that ports may go from being extremely energy-intensive to being very energy-self-sufficient by utilizing green energy. It's possible that ports may become green energy producers for the surrounding countryside.

Smart Ports understand that they are part of a larger ecosystem, thus they use technology to improve their company while also reducing their environmental effect. Being a Smart Port city necessitates a particular level of intellect and technological know-how, as well as the engagement of port communities and

residents. Smart Ports not only become digital, but they also reintroduce locals to their port infrastructure.

5.2.3. The World Bank's Digitalization Action Plan for Beirut Port

According to the World Bank, the main three pillars of digital platform implementation must be defined in the Port of Beirut digitalization action plan. Operational success in the new era of digital ports is no longer only determined by the size of the physical infrastructure. In order to effectively manage the processes defined by physical assets, ports must invest in both hard and soft digital infrastructure. Beyond infrastructure, it is clear that a suitable institutional and regulatory framework is required to ensure its smooth and successful operation. Finally, high degrees of automation do not eliminate the necessity for human intervention. Employees at modern ports must have (a) enhanced skill sets in order to effectively manage new technology, and (b) the capacity to keep up with short technological cycles. In a nutshell, the following three building pieces (pillars) are critical to the achievement of a successful digital implementation action plan:

1. **Institutional Pillar**: The first pillar represents the enabling environment, which includes the legal, regulatory, and institutional structure that supports public-private data-collaboration strategies, as well as the operational efficiency and long-term viability of digital solutions.
2. **Digital Pillar**: The second pillar refers to the necessary digital solutions, which are inextricably tied to the safe and efficient architecture of the port's physical assets and are intended to help supply cost-effective port logistics services.
3. **Human Capital Pillar**: Finally, the third pillar focuses on human capital, technologically trained ICT workers, and the range of technical and other competencies necessary in the port logistics industry to adopt, implement, develop, and sustain new information technologies.

The Action Plan:

1. **Translating international best practices into successful national implementation**: Based on lessons learned from worldwide experience, the World Bank provides important criteria for effective deployment of port digital solutions. These provide important assistance for Lebanese officials in implementing necessary adjustments. However, just because some policies have succeeded in other nations does not mean they will

work in Lebanon as well. Lebanese officials should sift this information and tailor it to the national political and economic environment, as well as the specific requirements of the Port of Beirut, to the degree practicable. A variety of diagnostics and studies should be established upstream for this aim, in order to detect current gaps and guide efforts in each of the implementation pillars.

2. **Looking beyond the mere IT infrastructure development**: Digital port solutions should not be seen just as a project to upgrade the IT infrastructure of a port. Their success is highly depending on the acceptance of structural reforms in the areas of port administration, trade facilitation, and national digital infrastructure at the same time. Global experience has shown that installing community systems and single-window software and hardware alone will not produce the desired outcomes unless it is supported by necessary legal, institutional, and operational changes. The Lebanese government should prioritize and sequence infrastructure development operations so that the enabling environment may be strengthened simultaneously.
3. **Securing political commitment at the maximum level:** The change management process should be driven by high-level political commitment to complete and successful execution. Execution tasks are distributed among many ministries in practice, necessitating strong coordination and collaboration. Obtaining the cooperation of all political parties in politically volatile situations, such as Lebanon, is a need rather than an option. High degrees of political complexity - typically based on community and partisan connections, conflicts of interest, and challenges relating to the varied public and private stakeholder environment - make reaching a consensus practically hard and increase the danger of losing funding dramatically. Once selected, the Prime Minister's office would adopt the digital agenda as a symbol of clear political commitment.
4. **Designing a digital port vision endorsed by the port community:** Designing a strategy through a bottom-up consultation approach that takes into account the interests and concerns of port users and end-beneficiaries is also critical. Digitalization impacts the activities of the port community as a whole, not only port and maritime authorities. As a result, any proposal to transform the present operating model and deliberately include automation and digital solutions must be underpinned by a shared vision and community agreement. This involves a shared vision for the future and governance frameworks, as well as defined roles and duties for all essential players.

6. How urban and country policies achieved similar situations

In this chapter, I will explore many case studies, each of which is related to Beirut's bomb in some way, to assess other countries' redevelopment and reconstruction plans. Defining and analyzing various case studies will aid in the development of local policies for the rehabilitation and redevelopment of Beirut's urbanism following the devastation caused by the non-nuclear bomb that destroyed the Beirut port and resulted in massive losses.

Cities often reconstruct in different ways after a conflict, depending on the dominant drivers guiding their recovery. Those drivers and their associated planning practices are influenced by authorities' attitudes toward the memory of the event (warfare, natural disaster, etc.) and their proclivity for conversation or new development, as illustrated in Fig. 30.

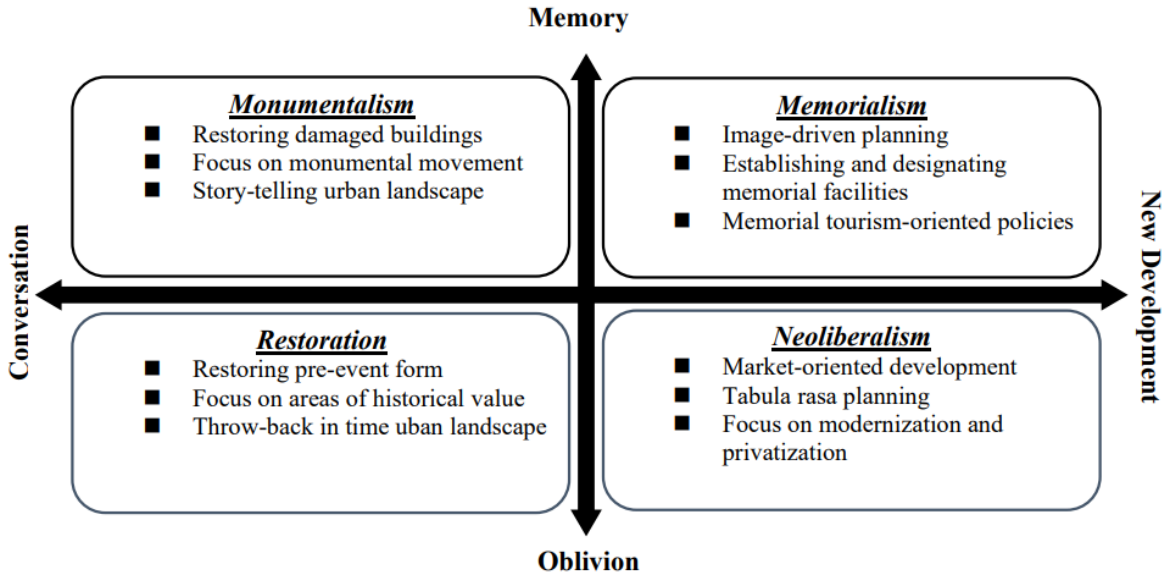

Figure 30 Drivers of Recovery

Some post-conflict areas have been reconstructed with a sense of oblivion. The redevelopment of Downtown Beirut following the Lebanese Civil War is an example of a recovery that focuses on new development while consciously avoiding the memory of the event (1975-1990). Private redevelopment has taken a blank slate planning approach, fueled by market-oriented neoliberal policies. As a result, in the city center, it marginalized state institutions and established

privatized planning as the paradigm. In keeping with the context of 'political and psychological amnesia' in the aftermath of the civil war, the redevelopment makes it difficult for visitors to imagine that the city center was once a battlefield.

Another example of recovery in which the memory of the event was washed away by restoration can be found in Old Town Warsaw following WWII. To protect Polish architecture from "western influences," the recovery was done through "creative reconstruction," which pushed the Old Town back to pre-1830 and erased the changes that occurred after that date because they did not fit the ruling realist socialist ideology at the time.

Other reconstruction examples, on the other hand, have chosen to include a reference to the event in the recovery process. The unification of Berlin is an example of monumentalism driving the preservation of conflict-related elements. After the memory-erasing "critical reconstruction" policies failed to express the story of change in Berlin, the recovery efforts recognized the return of the Berlin Wall to the city's landscape. The wall was thus used as a vessel to evoke strong images of the city's memory and transition.

The reconstruction of Hiroshima exemplifies a memory-informed new development case of recovery. Among the 215 Japanese cities bombed during WWII, Hiroshima is an example of memorialism-driven reconstruction, despite the nearly "clean slate" rebuilding imposed by the atomic bombing's massive destruction.

6.1 Hiroshima, Japan 1945

On August 6, 1945, a bomber dropped the first deployed atomic bomb over the Japanese city of Hiroshima during World War II (1939–45). The explosion is believed to have killed 80,000 people in its immediate aftermath, and radiation exposure led to the deaths of tens of thousands more. Three days later, another B-29 dropped an additional A-bomb on Nagasaki, killing an estimated 40,000 people. On August 15, Japan's Emperor Hirohito announced the unconditional

surrender of his nation to the Allies in World War II during a radio address, citing the devastating power of "a new and most cruel bomb." 2009's History

Figure 31 World War II Japan Explosion points (Wikimedia Commons)

How did the Explosion affect citizens health?

The uranium bomb had an explosive yield equivalent to 15,000 tons of TNT. It razed and burned approximately 70% of all buildings, resulting in increased rates of cancer and chronic disease among survivors (Fig. 29). In Hiroshima, 90% of physicians and nurses were killed or injured; 26 of 28 hospitals were rendered inoperable; and 70% of victims suffered multiple injuries, including severe burns in most cases. (ICAN)All the dedicated burn beds in the world would not be enough to care for the survivors of a single nuclear attack on any city.

In Hiroshima and Nagasaki, most victims died without receiving any care to alleviate their suffering.

The effects of a nuclear explosion last for decades and affect entire generations, but the fireball only reaches its maximum size in about 10 seconds. Five to six years after the bombings, there was a noticeable rise in leukemia cases among survivors. After about ten years, survivors started developing thyroid, breast, lung, and other cancers at higher-than-average rates. Infant mortality and miscarriage rates were higher in pregnant women exposed to the bombings, and

their kids were more likely to have intellectual disabilities, slow growth, and be at higher risk for cancer.

And, even now, seven decades later, cancers related to radiation exposure continue to rise in all survivors.

Immediate Volunteering response and achievements to occurring damages:

One day after the bombing, the lights were turned back on in the Ujina area, and a day later, around the Hiroshima railway station. According to Hiroshima Peace Institute records, power was restored to 30 percent of homes that had escaped fire damage and to all households by the end of November 1945.

Water pumps were repaired and restarted four days after the bombing, even though damaged pipes caused massive puddles among the ashes of wooden homes. The central telephone exchange bureau was destroyed, and all its employees were killed; however, critical equipment was recovered and repaired, and by the middle of August, 14 experimental lines were back in service.

Eighteen workers and a dozen finance bureau employees were killed instantly at the Bank of Japan branch in Hiroshima, one of the city's few concrete buildings, but the bank reopened two days later, offering floor space to 11 other banks whose premises had been destroyed. Tellers worked under open skies when it was clear, and under umbrellas when it rained. (The Guardian, 2016)

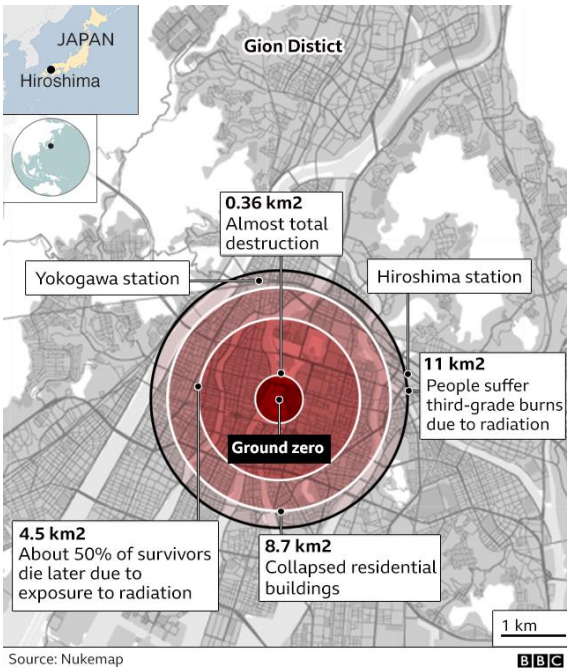

Figure 32 A map of Hiroshima showing degree of damage (BBC NEWS, 2020)

A limited streetcar service started up on the same day that a plutonium bomb decimated Nagasaki. The Sanyo Line trains between Hiroshima and Yokogawa stations resumed service on August 8, a day after the Ujina railway line did so due to the increasing need to transport people and supplies into the city. Despite being inside the two-kilometer zone, the prefectural government took control of Higashi Police Station and made it the hub for relief and search efforts.

Numerous volunteers came to the city from nearby cities like Fuchu, Kure, and even Yamaguchi. (Fig. 33) According to historians, the prompt restoration of services was the result of a community effort made possible by the arrival of numerous volunteers. "I do not believe the restoration of basic services was solely due to government coercion," says Yuki Tanaka, a historian, and former Hiroshima City University professor.

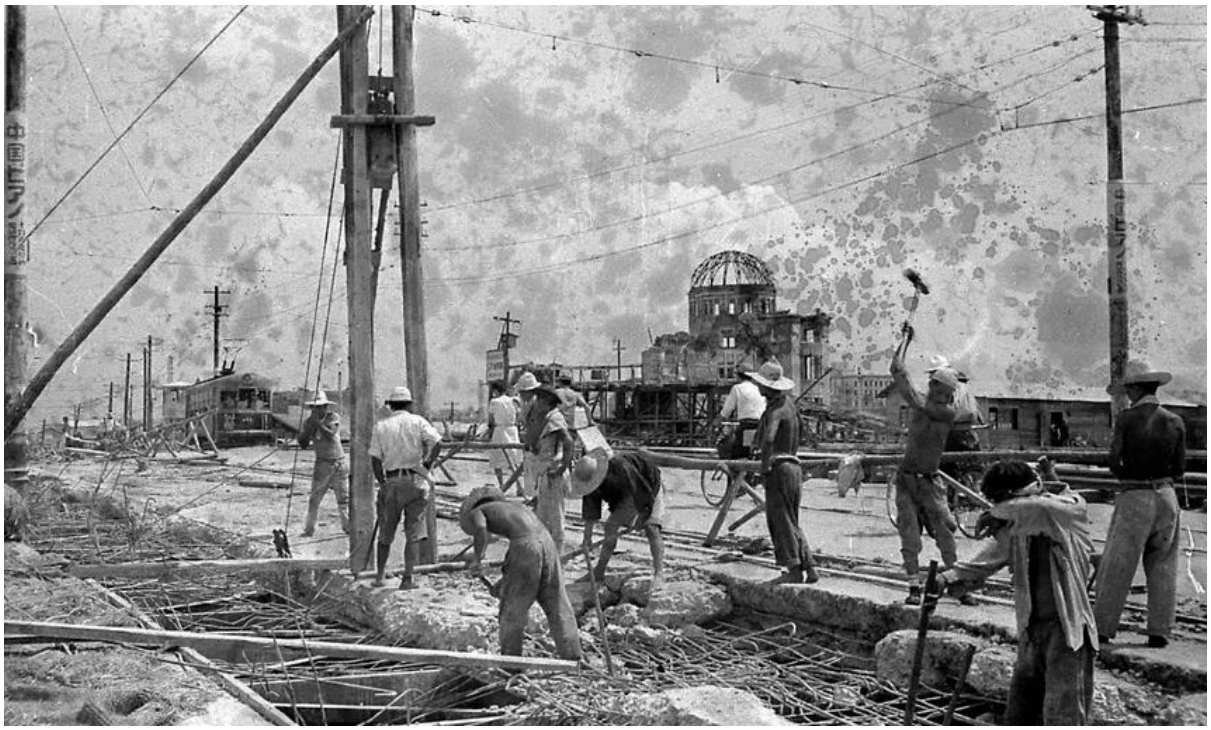

Figure 33 Laborer's working on the restoration of Hiroshima's Aioi Bridge in 1949. Photograph: Yoshita Kishimoto

How reconstruction planning has shaped Hiroshima into a memorial city:

The idea of turning a large area of Hiroshima into a memorial to the A-bomb victims gained power in 1946, when the local Chugoku Shimbun newspaper held a competition to solicit readers' visions for the city. Sankichi Toge, a poet, peace activist, and A-bomb survivor, won first prize.

Toge, who died in 1953 at the age of 36, envisioned a peace plaza memorial, a library, a museum, and a place where people from all over the world could come together to commit to peace. According to him, about 40% of the city should be covered in greenery.

Road Planning

In December 1945, the national government announced the Basic Policy for Reconstruction of War-Damaged Areas, which laid forth the foundation for reconstruction. Where it came to transportation planning, the basic policy allowed for the construction of roads with a width of 50 to 100 meters when it was needed for beautification and disaster prevention. Many damaged communities throughout Japan, including Hiroshima, saw this as an opportunity to construct ambitious 100-meter roadways, but most of the plans were later scaled back or abandoned due to practicality and budgetary challenges.

The symbolic value of Hiroshima's 100-meter road, today known as the Peace Boulevard (figure 34), was the driving force behind its construction.

Figure 34 Peace Boulevard and Memorial Park Hiroshima (Unique Japan Tours, 2017)

Land Use Transformation

The first land-use planning decision was made in Hiroshima in 1927, and it was modified multiple times before rehabilitation planning was determined in March 1949. The Peace Memorial City Construction Plan later incorporated considerable land-use modifications as part of the city's transition to a new age. The dominating movement towards memorialist influenced these changes significantly. The alteration of Nakajima District following the atomic bombs is a well-known example. The once-thriving commercial neighborhood was turned into a Peace Memorial Park to commemorate the calamity.

This memorial garden was also part of a larger renovation attempt to increase green space. Hiroshima city and prefectural planning authorities intended to adhere to international park standards.

On a national level, the government stipulated in the Basic Policy for the Reconstruction of War-Damaged Areas that reconstruction plans must include a 10% green space allocation. However, in a city like Hiroshima, where rivers are an important component of the urban landscape, rehabilitation plans included green spaces along the river. Riverbank greenbelts with a total area of 21.32 ha were envisioned in the 1952 plan (13.14 in the East and 8.18 in the West)

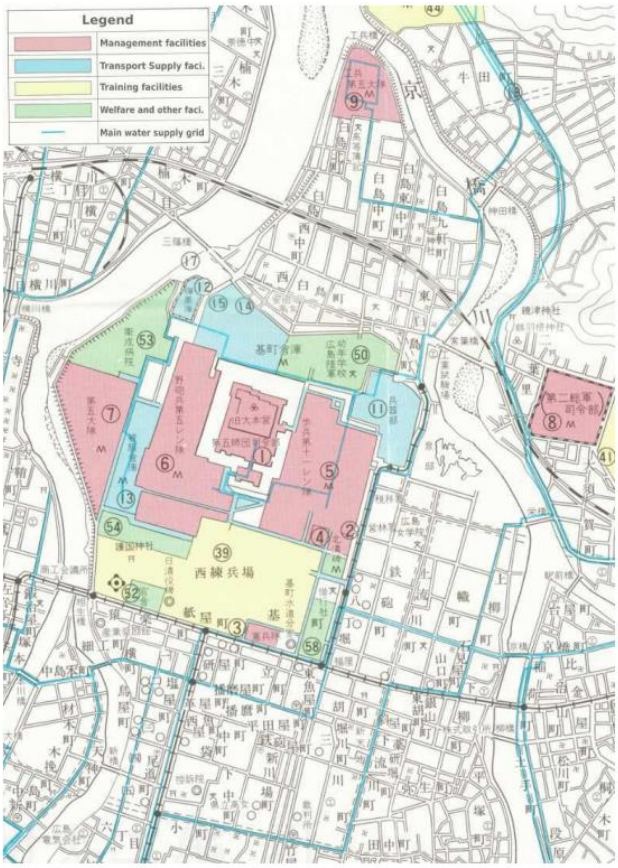

Figure 35 Military-use lands in Central Hiroshima (Alkazei, 2018)

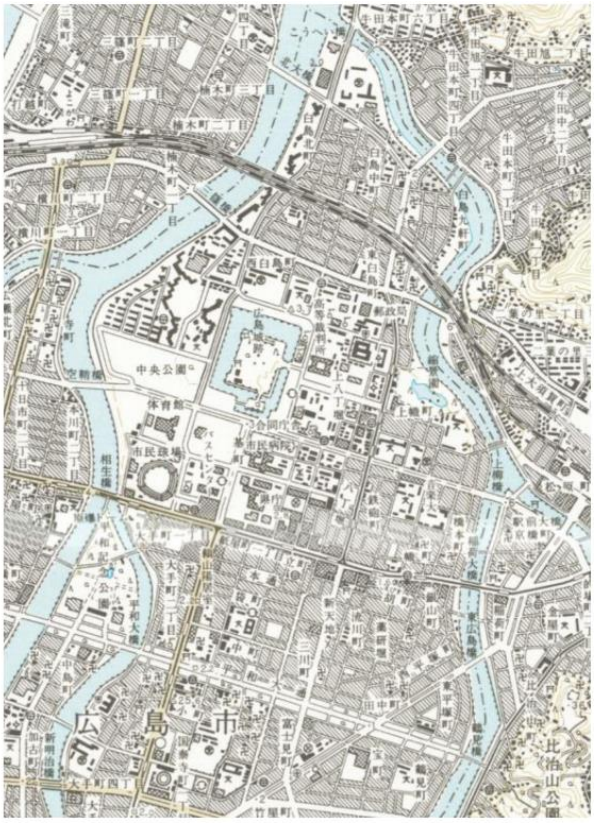

Figure 36 Map of Central Hiroshima in 1981 (Alkazei, 2018)

Motomachi District, a former military-use region in Central Hiroshima, is another notable example of land-use transition. The Peace Memorial City Construction Law made it easier for the city to take over land that had previously been used for military purposes (figure 35). The military lands in Hiroshima, which made up 9.3% of the city area at the time, were not only outmoded, but also unsuited for Hiroshima's new image as a symbol of peace. Motomachi's military lands have kept the area "far from regular inhabitants' daily lives." Following the bombing, illegal buildings built in Motomachi, as well as their fire-prone environment, were a long-term difficulty for the city's restoration. The district's military holdings were rehabilitated into municipal amenities, parks, and public housing only in the late 1970s, thanks to restoration efforts. Early rebuilding plans allocated 70.48 acres of land in the southern portion of Motomachi district for Chuo Park, but those plans were later scaled back to make place for housing. Public housing was constructed in response to the severe housing shortage that existed at the time (figure 36).

Conclusion

In rebuilding planning, Hiroshima's choice of memorialism as a driver of recovery was powerfully expressed.

The goal of road planning was to achieve goals like disaster prevention and symbolism while maintaining pre-war planning methods. Several places have undergone significant land-use changes, including as the reintegration of military-use lands in Motomachi back into civilian life. (Figure 37) Despite the nearly clean slate reconstruction, memorialism retained a reference to the explosion by establishing memorial facilities and preserving atomic monuments.

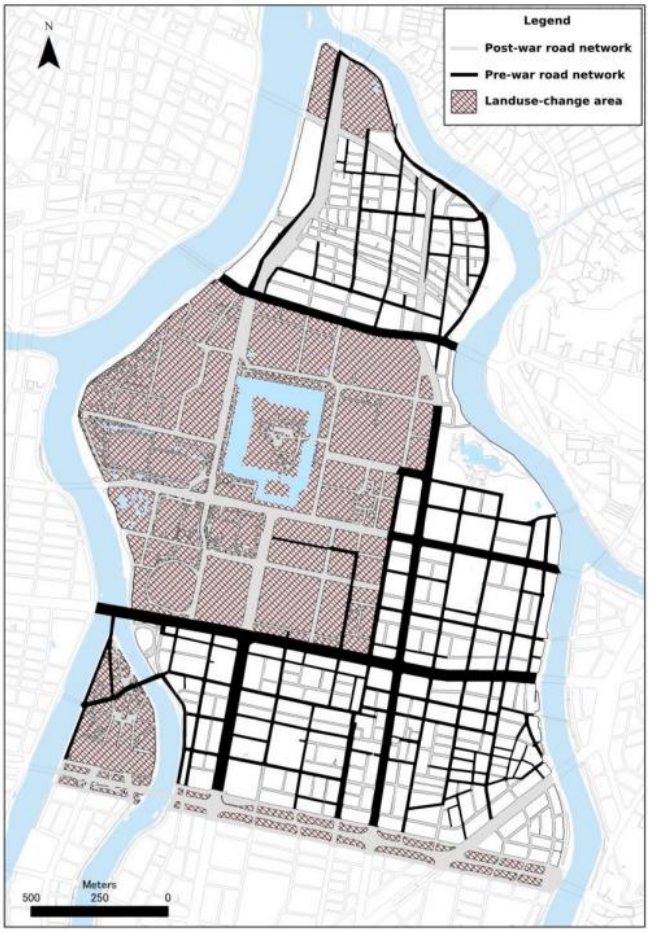

Figure 37 Changes in road network and land-use in Central Hiroshima (Alkazei, 2018)

Transnational urbanism[3] made a significant contribution to Hiroshima's rehabilitation. The influence of western conceptions in Tange's and Otaka's designs, receiving GHQ approval to develop a memorial city, and the proposals of foreign reconstruction experts were all examples of this contribution. The adoption of conservation and memorial ideas while rejecting Jarvie's Hakushima design demonstrates that the flow of planning ideas in Hiroshima's reconstruction may be defined as an example of synthetic borrowing.

Hiroshima's redevelopment was able to memorialize the atomic blast even amid fresh development, which sets it apart from other examples. Hiroshima's decision to memorialize the bombing served as a stimulus for rebuilding, eventually transforming the once-militarized city into a major tourist attraction. However, certain districts, such as Motomachi District, which underwent a considerable

[3] Transnational urbanism is a term that refers to the sociocultural and political processes by which social actors build linkages between locations across national borders to sustain new kinds of politics, economy, and culture.

alteration, are still static, and the influence of this transformation on its urban vitality has yet to be determined.

6.2 Halifax, Canada 1917

The Halifax explosion, also known as the Halifax explosion of 1917 or the Great Halifax Explosion, was a cataclysmic explosion that happened on December 6, 1917, when a munitions ship exploded in Halifax, Nova Scotia, Canada. In the tragedy, which devastated more than 1 square mile (2.5 square kilometers) of Halifax, about 2,000 people perished and 9,000 were wounded.

The Norwegian steamer Imo, carrying supplies for the Belgian Relief Commission (a World War I-era relief organization), left Halifax Harbour shortly before 9:00 a.m. and collided with the French vessel Mont-Blanc. For the French war effort, the Mont-Blanc was carrying 2,925 metric tons (or 3,224 short tons) of explosives, including 2,367 metric tons (or 2,609 short tons) of picric acid, 250 metric tons (or 276 short tons) of trinitrotoluene (TNT), 246 metric tons (or 271 short tons) of benzol, and 62 metric tons (or 68 short tons) of guncotton. Both warships began avoidance maneuvers after exchanging warning signals, but eventually collided. (Figure 38)

After several barrels of benzol—a highly flammable engine fuel generated from coke-oven gases—tipped over on the deck and spilled their contents, the French ship caught fire and slid into a dock. Emergency officials attempted to mitigate the damage as people gathered, drawn in by the billowing cloud of smoke. The Mont-Blanc, however, burst shortly after 9:04 a.m. The detonation and the subsequent wave pushed three blocks into the city, with the water level rising to around 60 feet (18 meters) over the high-water mark. The tsunami obliterated more than 1,600 structures, scattering debris over many kilometers. The Imo was headed toward the coast by the power of the wave, where it became grounded. (Britannica, n.d)

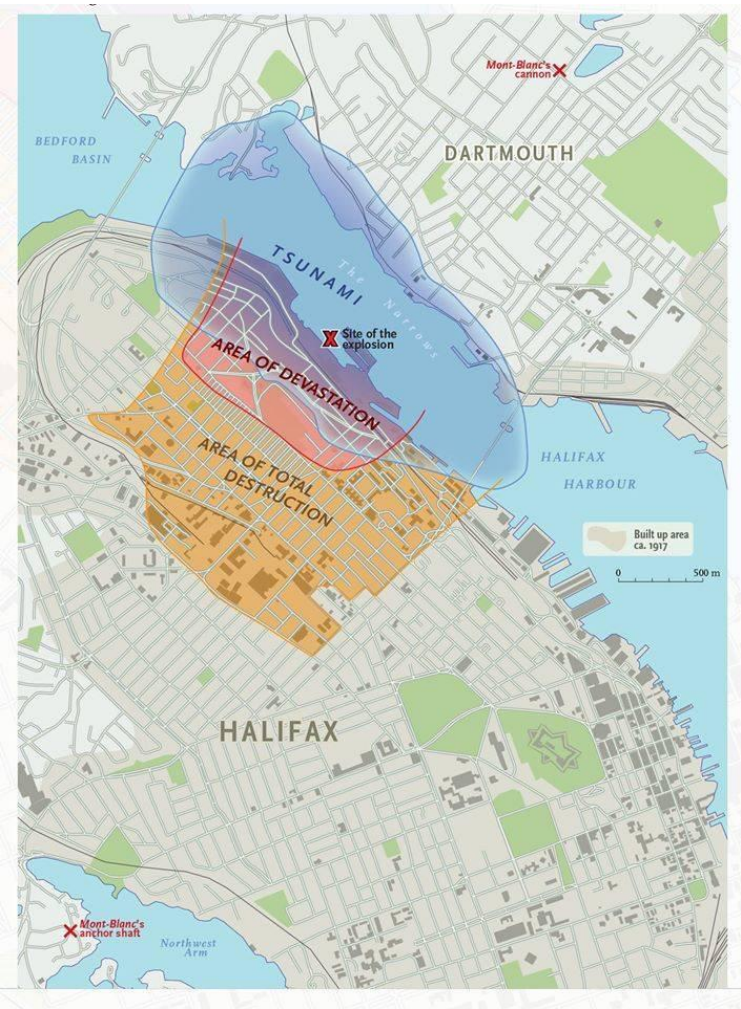

Figure 38 Area of Destruction of the Halifax Explosion, 102 years ago today (Reddit, 2020)

Hospitals were flooded with injured people following the explosion, and morgues struggled to identify and register the deceased. The disaster's news traveled swiftly, and relief began to come from both inside Canada and from the United States.

Damage Severity:

Halifax and Dartmouth's north ends took the brunt of the damage. The area north of Dartmouth was scarcely developed. Richmond was apocalyptic: trees and telegraph poles were snapped; houses were torn open, partially fallen, or on fire; and trees and telegraph poles were shattered. The railway yards, as well as a number of massive docks that originally projected into the harbour, were destroyed on the shore. Larger stone or concrete structures, such as the Richmond Printing Company, were razed to the ground. Surviving survivors, including those who were injured or in shock, roamed or crawled among the ruins, attempting to

piece together what had occurred. There were amazing survival stories all across Halifax. Tragic stories are also common. Many youngsters were killed or blinded by flying glass while walking to school that morning. Those who survived the bomb returned home to discover their homes broken and their parents dead or injured among the debris.

Hundreds of youngsters were among the 1,600 victims who perished instantaneously. In the days that followed, almost 400 additional people died as a result of their injuries. Some were beheaded, others lost limbs, and many were left with burns, fractures, and open wounds as a result of the explosion and its flying debris. In 1918, there were 1,631 known dead or missing, with roughly a third of them under the age of 15. The death toll has been updated to 1,946 by 2004 (The Canadian Encyclopedia, 2011).

More than 1,500 structures were destroyed, with another 12,000 being damaged. Following the explosion, 25,000 people were rendered homeless or lacked adequate shelter, an issue exacerbated by the winter snow that hit Halifax the next day. The total property damage was expected to be over $35 million.

Post explosion management

The public authority in Halifax was unprepared to deal with the tragedy. Prior to the outburst, social services were few, and they were largely provided by private charity rather than the government. Because the city's mayor was out of town at the time, Deputy Mayor Henry Colwell took charge of the emergency response. He had just a tiny police and fire department to rely on, and to make matters worse, the city's only fire pumper vehicle had been damaged, and the city's fire chief, Edward Condon, had been executed.

Despite these obstacles, Halifax could take use of legions of well-behaved military people who happened to be in town, offering a ready and ordered workforce to deliver help and some semblance of order. Crews from ships that either survived the bomb or landed in the port in the days after the blast came ashore to assist in the rescue and relief operation. On board Canadian, American, and other ships in the harbor, many homeless or injured victims were provided refuge and medical attention. Survivors from all over Halifax came to Richmond to save individuals trapped in their homes, transport startled and injured inhabitants to safety, distribute clothes, and clear debris from the roadways. In the early aftermath, local companies contributed supplies and gave work crews to assist. On Gottingen Street, Rockhead Prison was converted into a homeless refuge. Chebucto Road School, just outside the blast area, was repurposed into a graveyard since the city's commercial undertakers couldn't handle the influx of

bodies. Meanwhile, municipal authorities hurriedly formed committees to offer emergency food, housing, and transportation to the injured and relief workers in the affected districts (The Canadian Encyclopedia, 2011). The military was granted broad emergency powers to seize autos, prevent looting, and restrict passage into and out of Richmond.

Relief workers and supplies poured into Halifax from almost every municipality in Nova Scotia. The explosion gained global news as well. Trains delivered medical help, physicians, nurses, food, clothes, building supplies, and skilled laborers from all throughout the Maritimes, as well as central Canada and New England. The Massachusetts–Halifax Aid Committee, which was based in neighboring Boston and offered massive amounts of relief and support, was particularly important. Many medical staff from Canada and the United States were afterwards troubled by nightmares about the injuries they treated, especially among youngsters.

Money was generated for Halifax through special appeals in towns and cities, as well as contributions from governments throughout the world, including Australia (whose national government contributed $250,000). Governments, businesses, and people from all around the world contributed a total of more than $20 million. From 1918 until 1976, the funds were managed by the Halifax Relief Commission, which was established by the federal government in 1918 to handle claims for loss and damage, rehousing, and rehabilitation of explosion victims. The Commission assumed responsibility for the majority of relief and rehabilitation efforts. It offered continuing medical and psychological treatment; supplied cash for poor survivors' medical, travel, and housing needs; provided housekeepers for bereaved parents who needed to return to work; or provided money for persons whose wounds prohibited them from returning to work.

Similar Injuries to Beirut Blast

The kind of injuries sustained in both the Halifax and Beirut blasts are very similar. Blast waves interact with people both directly and indirectly, influencing many physiological systems.

The physics of blast phenomena aids our understanding of the risks. Shock waves accompany large explosions, an invisible phenomenon that can travel at multiple times the speed of sound and reach pressures of ten or more atmospheres.

The wind that immediately follows the shock wave is brief but extremely strong, carrying debris bits. The sound waves, or loud boom, move more slowly and arrive last at the observer. This chain of events happens too quickly for one to

react. There may not even be time to escape depending on how near one is to the explosion.

Many individuals were killed or injured in Halifax because of flying debris and glass. There were an unusually high number of penetrating eye injuries.

The Mont-Blanc burned for 20 minutes before exploding, and many people stood about watching the ship burn. Bystanders watched the incident unfold from inside, through glass windows, in December. Many people were hurt by flying glass during the tremendous blow; the Halifax Explosion is commonly referred to as the "blizzard of glass."

Planning Reconstruction by Adams

Though English urban planner **Thomas Adams**' role in reconstruction following the 1917 Halifax Disaster ("Halifax Explosion") is well known, the actual nature and degree of his work has not been subjected to serious research or educated analysis, and hence is unknown. Adams' vital working relationship with the Halifax Relief Commission, the federal government organization established seven weeks after the tragedy to take entire control of emergency management, is perhaps less well-known.

On July 6, Adams delivered his "Preliminary Report on the Planning of the Devastated Area at Halifax" to Chairman Rogers including:

1. Introduction
2. general economic considerations
3. proposed new streets
4. widening of Barrington Street (eastern end of Devastated Area)
5. straightening of Barrington Street
6. lands to be expropriated
7. open spaces,
8. application to the Nova Scotia government for approval to proceed with a town planning scheme

Adams' recommendations were approved, and the plan— Proposed Re-Planning of the Devastated Area, Halifax N.S.— was finished in August 1918. Adams traveled to Halifax to give it to the commission in person.

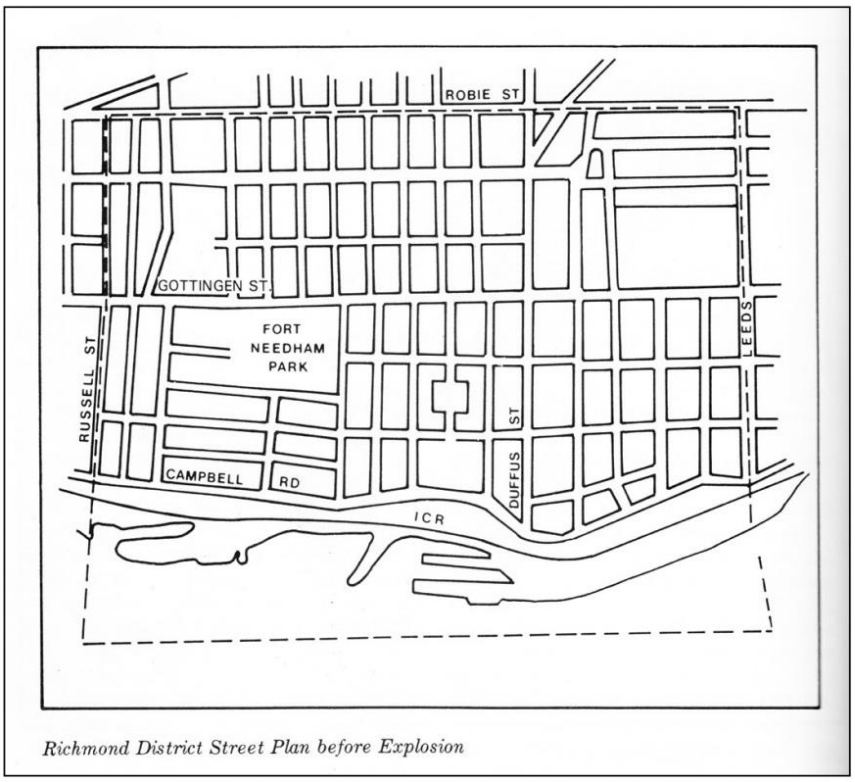

Figure 39 Richmond District Street Plan before the Disaster. Reproduced from John C. Weaver, "Reconstruction of the Richmond District of Halifax: A Canadian Episode in Public Housing and Town Planning, 1918–1921," Plan Canada (March 1976): 38

The substitution of diagonal roadways for the former rectangular layout is one of the primary aspects of this tentative proposal for the replanning of the Devastated Area. Two 80-foot-wide diagonal thoroughfares [Dartmouth and Devonshire Avenues] are supplied, with grades ranging from 4 to 5.5 percent, replacing gradients of 8 to 20 percent in the previous street system. While these new diagonal streets cover 508,370 square feet of land, they might save 433,140 square feet in streets, waste land, and other areas.

Fort Needham, one of the city's highest points, will be transformed into a park. At the northwest corner of the Devastated Area is shown the proposed location of a bridge across the narrows at Dartmouth. (Figure 40)

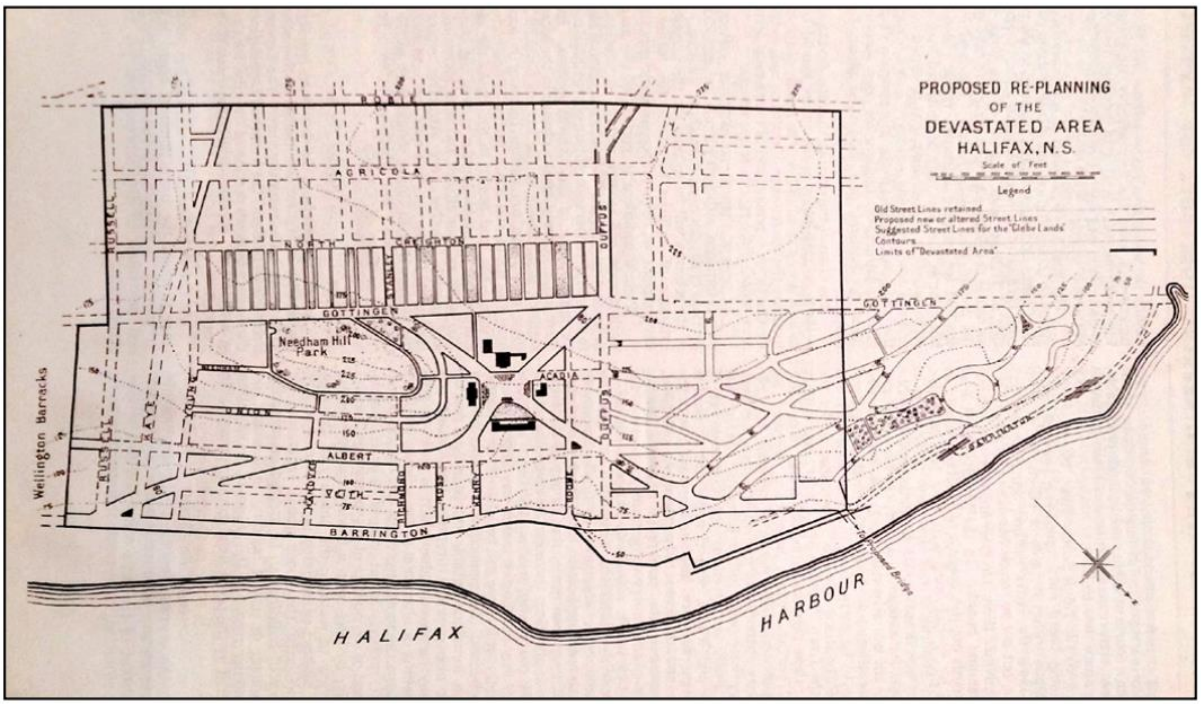

Figure 40 Thomas Adams's Plan for the Devastated Area showing elevation contours (broken lines) as well as streets Reproduced from Horace Llewellyn Seymour, "Town Planning in Halifax and Vicinity," Journal of the Engineering Institute of Canada 1, no.5, 1918

Engineer H.L. (Horace Llewellyn) Seymour, Adams's assistant, presented a paper on the idea to a conference of the Engineering Institute of Canada, of which he was a member, in September 1918. The plan's seven objectives are laid out in that document, which was later published in the institute's Transactions.

- A diagonal path to Gottingen Street provides more direct access in a northwesterly direction at an easy grade from Barrington Street at its southern end, closest to the city.
- More direct access from Barrington Street to Gottingen Street in a southeasterly direction, near the point where it will connect with any bridge that may be built over The Narrows [of Halifax Harbour].
- Albert Street was extended to the city's far southerly edge to assure its connection with the eventual continuation of Brunswick Street... making Albert Street a through road from the city's heart.
- Laying out curved streets in areas that have not yet been subdivided or developed, to achieve simple gradients and convenient building sites, as well as to connect with the rectangular development that has already begun.
- Provision of a central square for the construction of public structures
- As much as feasible, existing paved streets, sewers, and water mains will be preserved.

- Increase the industrial sector and shoreline as much as possible while keeping Barrington Street's convenience and directness.

Description of Adams's Plan

In an essay published in 1994 in a collection of papers on the disaster, Garry Shutlak writes that the plan "altered the grid with diagonals; rerouted roads along contours; eased grades; varied street widths according to function; improved access; provided a central square, park, and playgrounds; reduced housing densities; and expanded industrial space," which is entirely consistent with Adams' and Seymour's descriptions.

The layout "demonstrates Adams' empathetic eye for geography, with the roadways curving with the contours," according to Adams' biographer.

The rigid grid, which was the plan [layout] before the explosion and whose remains may be seen to the south of the destroyed area, is further divided by diagonals. A park was to be built on the highest ground [Fort Needham], with a center square. Adams planned to add undeveloped acreage nearby."

Conclusion

According to the findings of this research, planning for the reconstruction of Halifax's Devastated Area was a complicated process involving multiple agents, all of whom would have been monitored by the Halifax Relief Commission. It was not the work of a single individual. Given the conditions, the complicated ties with Halifax politics and society, and the amount of public money invested in the restoration, this is hardly surprising. So, what is there to say about Thomas Adams?

What is his legacy on the Halifax urban landscape, given that the scale and significance of his efforts have been inflated, and his plan for the Devastated Area has only been partially implemented?

The first is the fact that the reconstruction was planned, which analysts preoccupied with Adams' Garden City ties may have overlooked. Adams did not arrive in Halifax with the intention of transforming the devastated area into a Garden City or Suburb. He came with the conviction that it should be rebuilt according to his interpretation of "urban planning." It should be done as a single,

cohesive project rather than piecemeal, to ensure logical and efficient placement of the elements required for a healthy community (parks, schools, homes, shops).

Adams' accomplishments in creating and implementing his own plan, in contrast to his success in enlarging the Halifax Relief Commission's scope, were, all things considered, very modest. "His reputation could not ensure that his real proposals would obtain complete endorsement," Weaver says. Adams, no doubt, was irritated by this. However, it's important to remember that some of his ideas were implemented. Perhaps the most essential is the diagonal street, which has a moderate grade.

A mundane, physical topic like this might not pique the interest of most non-planners but creating and implementing this proposal would not have been easy, especially as it would have faced opposition as a wholly invention rather than a return to the pre-Disaster neighborhood.

It is still a prominent feature of the neighborhood.

Weaver discovered that it created the prospect of new residential lots with a view of the city, allowing for larger, more expensive residences for higher-income inhabitants and therefore encouraging social diversity. The proposal appears to have originated with the Relief Commission, and it was officially backed by architect Ross, but Adams undoubtedly bought into it. Providing housing for different social groups, spatially separated of course, was a component of Adams' early English suburb ideas, and it draws on a basic Garden City principle. As previously stated, the large-scale public park cannot be wholly attributed to Adams, but the fact that it was part of his design is not unimportant. It was something he treasured. The absence of any large, monumental structures or ceremonial boulevards is remarkable in this situation, as is the absence of any grand, monumental structures or ceremonial boulevards. These and other "City Beautiful" motifs were still in some designers' vocabularies after their peak popularity had passed. However, not in Adams' case. His planning principles were and will essentially always be more realistic and grounded in reality.

Although Adams did not build a Garden Suburb in North End Halifax, he did add to the city's current urban layout.

6.3 Toulouse, France 2001

Around 10:17 a.m. on September 21, 2001, an explosion in the AZF/Grande Paroisse plant in Toulouse (France), a TOTAL subsidiary, caused 31 fatalities,

hundreds of injuries, and extensive damages estimated at more than 2 billion euros to the plant, its neighbors, and the entire city. The explosion was caused by a portion of a warehouse containing about 300 metric tons of reject ammonium nitrate granulates.

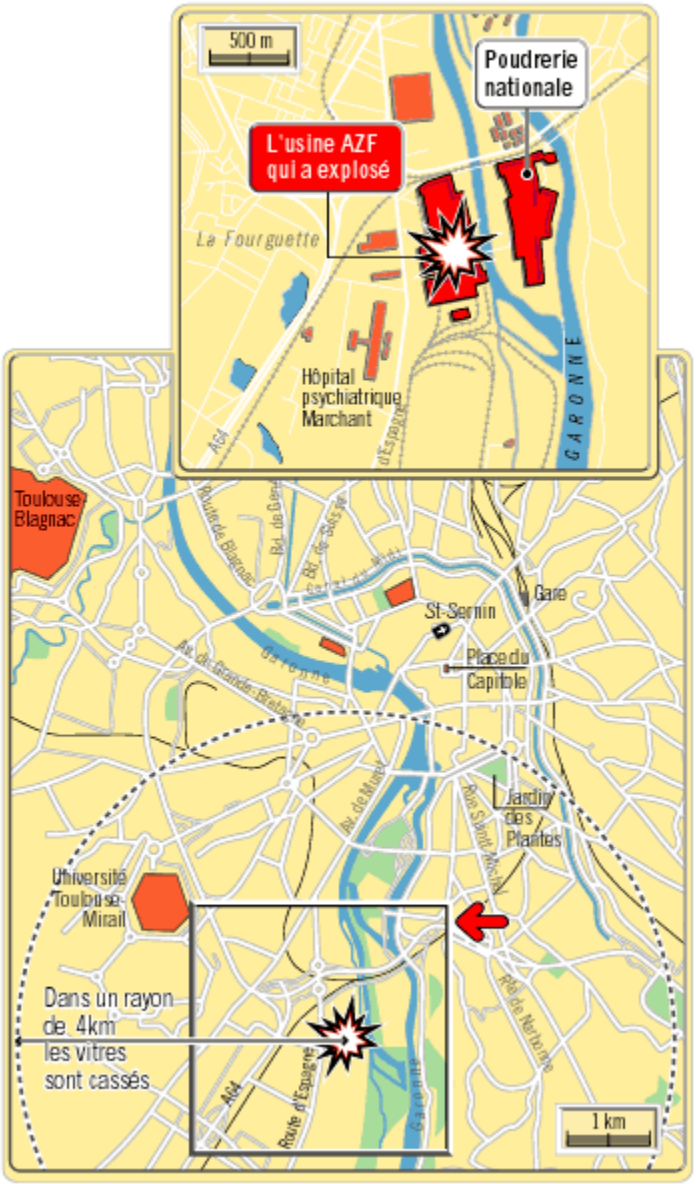

Figure 41 Toulouse Explosion site (Red Proteger. N.d.)

Aerial photographs of the plant were obtained in July (top) and early October (bottom) 2001, as shown in Figure 42. The crater from the exploded hangar 221 can be seen in the lower view, as well as the conveyor that transports the finished goods to the main storage area. The conveyor's support beams were painted green. They are not visible on the top figure because the conveyor's top hides them. The deposits of AN from the prilling tower may be seen on the roof of the AN's main storehouse.

Figure 42 Aerial Views of the AZF plant (Guiochon, 2012)

Social Impact

There were 266 plant personnel and 100 subcontracting company agents on the scene at the time of the incident. Thousands of individuals were hospitalized; as of October 17, 2001, the local authorities (Préfecture de Haute-Garonne) had counted 2,442 persons; 8042 people have been subjected to a formal medical inquiry. Wounds, fractures, amputations, contusions, and other bodily injuries are all documented. Auditory problems arose as a result of the blast's dual impact and the acoustic trauma caused by the explosion: partial or complete deafness, punctured eardrums, hypoacusis, tinnitus, otalgia...

5.5 percent of secondary school pupils and 6.3 percent of elementary school/kindergarten students in a 2-kilometer radius of the explosion who were tested 8 to 10 weeks after the explosion had hearing deficits (> 25 dB). Hearing tests for those who were within a 1.7-kilometer radius of the explosion were advised by health authorities (French Ministry of Sustainable Development, 2013).

The NO2, NH3, and particulates generated by the explosion caused temporary ocular (conjunctivitis, vision impairments...) and respiratory irritations (tracheobronchitis...) in the nearby population. Within 5 weeks of the accident, these issues looked to be subsiding. However, the evidence gathered allows for the determination of the lack of substantial health impacts linked to these drugs in the short and long term. Psychological traumas are also documented: in the weeks following the explosion, over 8,000 persons saw their general practitioner for acute posttraumatic stress. A psychotropic medication (anxiolytic, antidepressant, hypnotic) was started on 5,000 patients. These figures, according to experts, are understated since they only include those who sought medical attention. The blast had a significant influence on psychological issues (depression, anxiety, etc.). Furthermore, two studies undertaken in collaboration with the French National Educational Service demonstrate that one out of every seven kids still show evidence of post-traumatic stress one year after the tragedy.

In addition to the physical and psychological traumas experienced by Toulouse residents, there are substantial social disturbances, particularly those related to the destruction and damage of houses, communal equipment, and structures, technical unemployment, and job loss... To resist industrial dangers and defend the interests of the affected communities, associations and a collective have been formed.

Environmental Impact

According to the French Ministry of Sustainable development, Nitric acid leaks were generated by the explosion, which damaged storage tanks carrying ammonium nitrate solutions. A broken heated ammonium nitrate solution (95 percent) tank, however, had no leakage. The flow of nitric acid into the Garonne River was detected by fire and rescue personnel on the day of the explosion. The river was contaminated by nitrogen-containing solutions released by the AZF plant.

Only an increase in NH4, NO3, and COT was noticed among the 120 parameters evaluated in the raw water. The Garonne oxbow recorded the highest readings. The pollution passed through between September 22 and 27, 2001, with highest concentrations from September 22 to 24, 2001: 331 mg/l in the oxbow and 16 mg/l in the Garonne; 1,277 mg/l in the oxbow and 63 mg/l in the Garonne; and 23 mg/l in the oxbow and 8.7 mg/l in the Garonne.

A few days later, on October 17 and 18, the amount of ammonia released into the Garonne surpassed the prefectural order limits. The discharge of gas into the

atmosphere caused inhabitants pain since the ammonia network was no longer pressurized following the incident. A water-borne ammonia collecting mechanism was installed, with ammonia-containing wastewater released into the Garonne. The approved levels were exceeded due to an inaccurate assessment of this discharge of ammoniated water; roughly 9 tons of ammoniated solution thus heavily contaminated the Garonne, killing aquatic life (dozens of kg of fish killed). The observed mortality is mostly due to high ammonia levels associated with high pH (up to 8.6), which promotes a change in the chemical balance towards a non - ionized form of ammonia (free NH3), which is very deadly to fish.

Chemical pollutants discharged into the environment can be assessed using atmospheric measurements taken by the ORAMIP (local air quality laboratory). The gaseous discharges mostly comprised NH3, NO2, N2O, and dust... For NO2, the predicted exposures in the neighborhoods closest to the site and within the cloud's trajectory fall short of the WHO's one-hour guideline limits (200 g/m3).

Economic Impact

A large part of the AZF plant's 70 ha is devastated and debris of all kinds littered the site:

- The depot's detonation created an oval crater spanning 65 x 45 meters and 7 meters deep in the northern area of the facility, causing significant damage.

- Structures of about one hundred meters in length were partially collapsed; - For certain buildings of lighter construction, just the entirely twisted metal framework remained.

- Certain ammonium nitrate storage tanks were demolished, resulting in pollution of the Garonne.

- Nitric acid leaks have been discovered.

- A 95 percent hot ammonium nitrate solution was damaged, but no leak was discovered.

- Two of the site's stacks were destroyed,

- After the explosion, some structures began to tilt...

Total loss exposure from the explosion at a chemical facility in Toulouse is expected to be between euros 610 million and euros 910 million (£378 million and £564 million), according to AGF, Allianz's French insurance arm. (2001)

The corporation is the factory's primary insurance, and it is controlled by the oil giant TotalFinaElf. It predicted that its own exposure would be in the $7 million (£4.7 million) area.

It stated its $422 million (£287.1 million) main exposure will be covered by reinsurance.

And per the French Ministry of Sustainable Development, the Préfecture produced a study on the enterprises immediately damaged by the explosion six months after the disaster. Nearly 1,300 businesses, employing over 20,000 people, claimed losses of varying degrees as shown in Figure 43. The French government provided 10.4 million euros in assistance to businesses and suggested a tax exemption of 1.7 million euros.

	Significant impact		Limited impact	
	Nbr of establishments	**Nbr of employees**	**Nbr of establishments**	**Nbr of employees**
Industry	58 (including 30 small/medium sized industries and 28 groups)	5,408	54 (including 25 small/medium sized industries and 29 groups)	6,358
Service	33	511	285	4,368
Retail	81	767	461	2,775
Total	**172**	**6,686**	**800**	**13,501**

Figure 43 Source: « Toulouse, six mois après la catastrophe « (Six months after the catastrophe) – Governmental brochure

Significant property damage was also observed in an extensive oval-shaped perimeter oriented toward the south of the city around the industrial zone: a nearby urban boulevard, several public buildings that are no longer in use, and windows broken up to 7 kilometers away, according to several sources.

The shock wave and other missiles wreaked havoc on 82 schools, 19 middle schools, and 15 high schools (36,000 pupils), as well as four higher education institutions and three university dorms. A depot storing around one hundred buses was destroyed (30,5 M€) in front of the plant, and countless other stores were

damaged. A home appliance store 320 meters from the explosion's epicenter, as well as a car repair business 380 meters away, both collapsed, killing people.

Based on the information available and the rating criteria that apply to the 18 parameters of the scale that was formally adopted in February 1994 by the Member States' Competent Authority Committee for implementing the "SEVESO" directive on hazardous substance handling, the accident can be classified by the four indices listed below:

Figure 44 SEVESO directive (Aria Developpement Durable)

How did the Public Authority manage the crisis?

The organization of aid is the focus of the governmental authorities in the near future. Their mobilization and coordination (firefighters, SAMU, hospitals, clinics) were astonishingly successful. Security activities were swiftly carried out on the explosion scene, and investigation work commenced. The State decided to cease all chemical division activities as a precaution, pending a decision on its future at a later point. The city hall rapidly established a crisis unit and provided psychological aid; the whole operation is based in the city center, at the Capitole, while the impacted people are on the periphery and public transportation is disabled.

In the days that followed, the government began a complicated work encompassing issues such as emergency rehousing, clearance, and public order, as well as consultation and mediation (with insurers, for example).

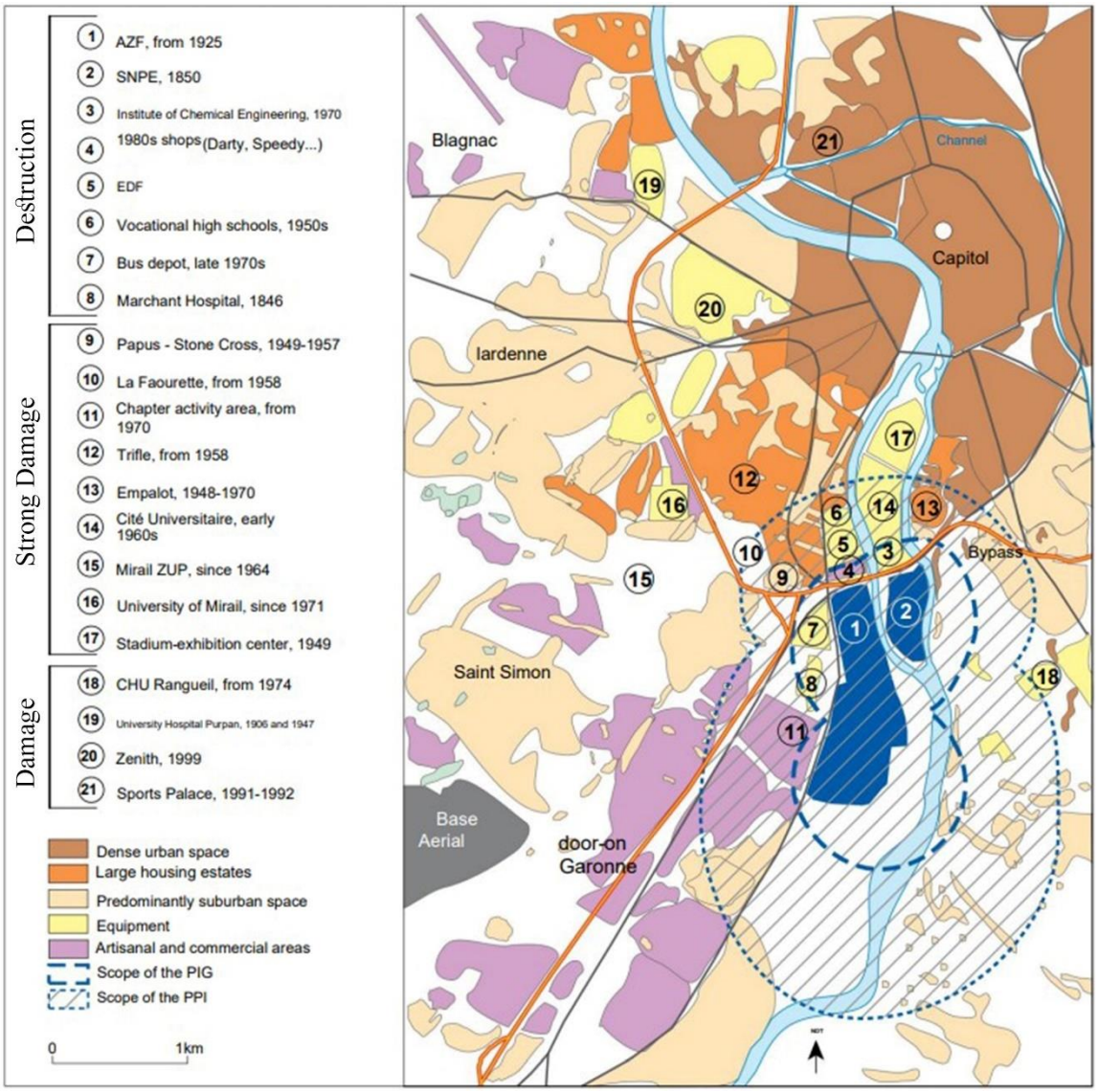

Figure 45 Perimeters of protection and damage observed (HAL, 2020)

The prominent structures and landmarks that were either destroyed, severely damaged, or considerably damaged are depicted in figure 45. The government opted to move quickly after the explosion, defining the perimeters as the general plan perimeter and the perimeter of the intervention plan, which surrounds the explosion perimeter to begin emergency activities.

Conclusion

The government and all public actors have been criticized for their "let it be" attitude and inability to control urban growth in high-risk areas. Municipal governments and the state share responsibilities for the last fifty years of urbanization. The topic is perhaps irrelevant; what's more intriguing is that the issue of industrial risk was not discussed.

G. Hersant, the deputy mayor in charge of town planning from 1977 to 2001, acknowledges that we "never truly studied the dilemma" of the ring road and chemical facilities coexisting. And it's far from the only city in France where such an observation may be made.

7. Sociological Survey done by the Author

7.1 Overview

In this chapter, the author will discuss the stakeholder interviews related to the Beirut explosion and will present the findings of this study based on the findings and using the comparative analysis approach.

7.2 The main stakeholder surveyed

The author had the opportunity to meet a professional urban planner and architect, Sylvia Yammine, to discuss the case of Beirut with her in order to explore ideas and highlight diverse views.

SYLVIA YAMMINE, CEO, Architect and Urban Planner, SY ARCHITECTS, Zgharta, North Lebanon- Mrs. Yammine is the Chief Executive officer of the architectural firm SY ARCHITECTS. She has many years of experience in design, planning, residential, interior, consulting, and development including numerous years within varied healthcare settings and in urban planning. Her firm is committed to creating buildings and spaces which successfully combine both aesthetics and functionality without compromising either. She is currently developing several hospitals in Lebanon and Syria within accord of international standards. The SY ARCHITECTS healthcare developments cover all facets of planning, design, building, and maintaining of the facilities, and seek the most current international concepts and strategies. Recent projects include a new master plan for the city of new Bedford in the United States, has been published in many journals including the “landscape Urbanism” (2010). She is a member of the order of Engineers and Architects in Tripoli Lebanon. Harvard Alumni, she has an advanced management and development in Real Estate at the Harvard Graduate School of Design. Prior to that, she studied architecture at the Lebanese University and urban planning at the “Academie Libanaise des beaux arts” (ALBA).

Ms. Yammine completed the educational hospital Design from the American

Academy of continuing medical education, and in 2008, she joined the Health Care Design Conference in Washington, D.C.

7.3 The Interview

Author: What role did you play in post-explosion urban planning?

Sylvia Yammine: "*We attempted an urban declaration of Beirut in the order of engineers in Beirut for 7 months, where I joined. For the first time, all of Lebanon's universities, particularly the faculties of urban planning, worked together with the Order of Engineers and Architects to develop the Beirut Urban Declaration, which is the first time each university has its own representative, and I was representing the Academie Libanaise des Beaux Arts (ALBA) to try to put directives and policies in place to create an action plan.*

I also attended the Venice Architecture Biennale in Italy on September 14, 2021, to discuss and plan the future rebuilding of Beirut with leading architects and individuals such as Renzo Piano, Vasconi Architects by Thomas Schinko, UNESCO, Digital Twin, Head of the Ancient Port of Genoa- Mr. Alberto Cappato, and many others. In Beirut, urgent action has been initiated in collaboration with UNESCO and other relevant organizations to aid in the reconstruction of the city. A bigger concern is whether or not to handle city and port planning and create a Master plan. The issues and current solutions were discussed during this conference. It clarified how to employ tactical urbanism and modern technological technologies to create a cohesive masterplan design. Topics to be covered include job creation, how to improve the position of small communities in terms of their surrounding environment, and community enhancement.

I also took part in the Union des Architectes Francophones pour la Santé (UAFS) in Monaco, an initiative to promote architectural excellence and the knowledge of architects who specialize in or have practical experience in the field of health design. My concept, which I presented, was to use a green corridor to connect Lebanese hospitals."

Author: What kind of Port should be designed?

Sylvia Yammine: "*This is a national issue because we must analyze the port's image, as well as how to reimagine the city in relation to its port, as there is a split between the city and the port of Beirut. How can Beirut's waterfront*

urbanism be revitalized? How can the port be rethought? Why do we need a national discussion? Because, as an urban planner, I can tell you that the basins 1, 2, and 3 should be turned into tourist attractions, and the port should be extended to the side facing Burj Hammoud. In 20-30 years, I can envision moving or relocating the port completely away from where it is presently. All of this is chosen by the government, which is why we need a national discussion or congress to discuss the future of the port, which is the MAIN problem because Beirut is a port city. Second, how should Beirut's city and port be rethought in the aftermath of the explosion?"

It's terrible to say, but it's an opportunity to reconsider Beirut's port relationship with the city: How can the city be moved to the water and how can Beirut's urban waterfront be dynamized?

Author: Do you think Beirut port is capable into transforming into a Smart Port?

Sylvia Yammine: "*Yes, we can accomplish it easily if we have the will, and if you have the will, you can find money."*

Author: The non-governmental organizations (NGOs) played a significant part in Beirut's post-bombing administration. What, in your opinion, is lacking to provide a better working environment for the NGOs?

Sylvia Yammine: "*Because we have something called Tactical Urbanism, where they started working on tiny ideas, I thought of the notion of having a HOUSE OF NGOS and how to bring NGOs and local communities together to have such an impact on urban development.*

Many NGOs, such as Fadel & Dagher's APSAD, worked hard to preserve the city's heritage and identity. Since each NGO is currently reorganizing and operating on its own, we need establish a common platform for all NGOs to coordinate their efforts. All of these organizations, particularly UNESCO, which is in charge of urban heritage, had a positive impact. It was critical to protect all of the urban heritage values in this area. I would express my gratitude for members of the Order of Engineers and Architects in Lebanon, as well as all the NGOs that provided social services and assistance, such as delivering food and clothes to those affected by the explosion, and for NGOs involved in the urban and historical heritage of Beirut."

Author: What are the initiatives for rebuilding Beirut port without involving the government, in your opinion?

Sylvia Yammine: "*We decided to take the most important step in planning with the Order of engineers and architects and to involve urban planners and architects from all over the world through events and conferences abroad because it is not logical to reconstruct Beirut port without involving the government, and since the government has no intentions and no will, we decided to take the most important step in planning with the Order of engineers and architects and to involve urban planners and architects from all over the world through events and conferences abroad. On the other hand, non-governmental organizations (NGOs) are working hard and taking part in the reconstruction of Beirut, which we might term Tactical Urbanism because it contributes to low-cost and quick projects. Many initiatives were created by NGOs, and many international municipalities are sponsoring these projects to protect Beirut's Urban Heritage, which includes not just buildings but also trees, stairs, and urban furniture.*

First, we need an urban agency that provides control and has local and international specialists, and this agency will rely on the government for funding and control. Because we don't have trust, we need to reform our public institutions, so this agency will be semi-public – private. This organization will compile all data and proposals for Beirut and consult with foreign specialists in order to monitor and oversee all of these proposals and activities. Establishing a committee of local and international specialists connected to the order of engineers and architects related to urban planning and heritage in order to attain this level of control over each step that must be taken in Lebanon (has full trust).

Second, the structural composition of the CSU superior council of urbanism (part of General Directive of Urbanism) should be reconsidered because this council has a significant impact on urban planning decisions in Lebanon. And, by evaluating this structural makeup, we can ensure that the DGU's decisions are reliable.

Third, providing financial autonomy to municipalities, which are viewed as a key indicator in urban planning."

Author: Can we use this crisis, this tragedy as an opportunity to rise better? To recover sustainably, inclusively, efficiently? Is there a way to recover better?

Sylvia Yammine: "*Yes, it is harsh to say so, but it is an opportunity to rethink Beirut urbanism, replan it, and develop a new urban model to adapt it to this problem while maintaining the city's traditional history while also considering modern heritage and the future. How can we develop this neighborhood while*

maintaining Beirut's identity? It's a once-in-a-lifetime chance to pique the interest of more worldwide specialists in this initiative. For example, the General Manager of France's most important urban agency is Lebanese; if he and many others like him participate as foreign specialists to the Urban Agency that we need in Lebanon, we may accomplish the best urban plan for Beirut."

Author: What do you think of designing a Memorial to honor the victims?

Sylvia Yammine: "*Yes, but not by maintaining the destroyed SILOS as a memorial; instead, we may design a sculpture, and Rudy Rahme has already developed the tallest (about 36 m) sculpture that represents the Beirut blast victims, but they are awaiting funds."*

7.4 Survey Results

According to Sylvia Yammine, now is the perfect time to properly plan the urbanism rebuilding of Beirut in order to make better judgments, as the explosion has occurred, and we now have the opportunity to redevelop the Beirut port city and better integrate and link it with the adjacent districts. We should reconsider the port's position and the basins' utility, according to her, because we can convert some basins into touristic and green open basins while retaining the port's functionality in others. This is the perfect opportunity to reconnect this divided city, revitalize it, and convert it into green open spaces while conserving the city's urban heritage and identity. Beirut is a magnificent city that just lacks effective urban planning. While there are urban planning plans and the Beirut Declaration, we still need to focus on empowering public and private institutions, which are the major reasons for this action plan's success. She believes that we need an urban agency comprised of local and foreign experts who can pool their knowledge, incorporate all of the post-bombing plans, and establish the greatest urban rebuilding plan for Beirut. She also believes that the General Directive of Urbanism in Lebanon is tainted by corruption, and that the Superior Council of Urbanism should reconsider the composition of its committees, which have a significant impact on the action plan and declaration developed by the Order of Engineers and Architects in Lebanon.

8. Results and Discussion

8.1 Overview

In this chapter the author will report the findings of the study based upon information gathered in the previous section. As mentioned previously there are three case studies ready to be analyzed: Hiroshima, Japan, Halifax, Canada and Toulouse, France. These situations will be investigated in terms of post-disaster urban reconstruction and redevelopment. On the other hand, the author will examine the World Bank's Beirut port strategies for transforming Beirut into a smart and digitized port. The results of the conducted studies are analyzed using the analytical methodology and are presented in this section under two titles: observation summary and survey results.

8.2 Beirut and Hiroshima

A comparison was conducted between the explosion in Hiroshima, Japan, and the blast in Beirut, according to the findings. Starting with the social repercussions, Table 2 shows that 26 out of 28 hospitals in Hiroshima were damaged, while all 17 hospitals in Beirut were impacted, with 4 hospitals being completely destroyed and 13 being partially destroyed. Despite the immediate need for hospitalization, post-explosion ailments and injuries like as cancer in Hiroshima and lung damage, eardrum ruptures, and brain traumas in Beirut were the outcome. In Hiroshima, 70 percent of the 255,260 residents (roughly 178,682 casualties) were deemed victims of the catastrophe, whereas in Beirut, 71.6 percent of the 2,424,000 citizens were considered victims of the tragedy (approximately 1,696,800). When comparing the remote regions of Hiroshima (906.7 km2), 70% of residential structures were damaged, whereas 52 percent of residences in Beirut (19.8 km2) were damaged, resulting in an increase in homelessness.

Exploring the post-disaster reaction and management, on the other hand, we can conclude that Hiroshima got assistance from foreign nations and adjacent cities, in addition to governmental and institutional assistance, given that it was the twentieth century. The government was able to restore 30 percent of the electricity and water pumps on the same day as the explosion, while Beirut was only supported and assisted by non-governmental organizations who did their best to recover some residences and ensure that the basic necessities of life were

available in order for these homes to be habitable. NGOs were divided into districts, with each organization in charge of one or more districts, in order to reconstruct and assist inhabitants in the best way possible, giving not only housing but also food, water, and clothing each day following the explosion. On that point, we should shine light on the callous administration that was incapable of assisting its own people. External nations helped by sending hospital planes, food, medications, and other supplies to the populace.

Table 2 *Social impacts on citizens and post disaster response comparison - Graphics managed by author*

SOCIAL IMPACTS ON CITIZENS		
INDEX	Hiroshima, Japan (15,000 tons TNT)	Beirut, Lebanon (300-400 tons TNT)
Hospitals damaged	26	4 damaged / 13 partially damaged
Residential Buildings Damaged	70%	52%
Victims	70%	71.6%
Diseases and health conditions	Cancer (Leukemia)	Lung Damage – Eye/Eardrum ruptures – Brain Injuries
IMMEDIATE POST DISASTER RESPONSE		
Same day electricity recovery	30%	-
Same day water recovery	YES	NO
Connection lines recovered	14	*Interrupted Since Inflation
Banks Reopening	In 2 days	*Interrupted Since Inflation
Type of Response	Governmental and NGOs	Only NGOs

After being inspired by poet Sankichi Toge, who addressed and visioned the city as a memorial peace center with more green and open spaces, Japan's government was able to develop a fundamental policy plan for the restoration of Hiroshima within four months after the disaster. The government took this into account and implemented a land use transformation plan that included converting the commercial sector into a peace memorial park that met international park standards and included 10% green space, resulting in a greenbelt along the river. However, unlike the Lebanese government, which got several suggestions,

including proposals from France and Germany, Japan received foreign rebuilding offers and took them into consideration. Unfortunately, the Lebanese government ignored these proposals and did not investigate them. We can claim Lebanon is financially strapped, but when compared to Japan, which also faced financial difficulties but was able to implement a step-by-step reconstruction plan. They took the residents into account, and although they gave immediate assistance and management to the citizens, they also took them into account in the post-explosion rebuilding plan by converting military grounds into public housing owing to a housing shortage.

8.3 Beirut and Halifax

The Halifax explosion caused extensive damage to the harbor, with 1,946 people killed and 13,500 structures destroyed or damaged. The entire financial damage is anticipated to be around 35 million dollars. In comparison to Beirut, the bomb killed 218 people and injured 2000 others, causing 10,000 structures to be damaged and 77,000 flats to be demolished. Because Beirut is a densely populated city with a smaller scale than Halifax, the Beirut port is located in the heart of a densely populated residential area with both residential and commercial buildings. The explosion occurred in the middle of all of these structures, resulting in higher estimated financial losses of up to 3.8–4.6 billion dollars as listed in Table 3 below.

Table 3 *Damage Severity Comparison - Graphics managed by author*

DAMAGE SEVERITY		
INDEX	Halifax, Canada (2,900 tons TNT)	Beirut, Lebanon (300-400 tons TNT)
Total deaths	1,946	218
Damaged buildings	13,500	10,000
Estimated financial Loss	35$ Million	3.8$ – 4.6$ Billion

The ports of Halifax and Beirut were both devastated, causing in significant losses for both countries. Halifax was the port through which tens of thousands of Canadian, British Empire, and American troops passed on their way to the battlefields of Europe, or on their return home, thanks to one of the best and

deepest ice-free harbours in North America. The harbour not only housed Canada's embryonic Royal Canadian Navy, but also served as a repair and resupply port for Royal Navy warships and trade ships from all over the world. Similarly, the Port of Beirut is Lebanon's major shipping and clearance terminal, passing through it around 70% of the country's incoming and leaving commercial flow. It is also positioned in a vital location that connects the commercial markets of Asia, Europe, and Africa, shortening commercial navigation journeys as compared to other routes.

On the other side, the Halifax explosion's post-disaster handling was comparable to Beirut's. The major reconstruction stages were reviewed in both cases by the residents themselves, with assistance from neighboring nations, surrounding cities, and non-governmental groups. Not only did non-governmental organizations (NGOs) assist, but in both situations, Canadian and Lebanese residents gave their own houses as lodging to all those who had lost their homes. In Canada, the Halifax Relief Commission was in charge of all donations, whereas in Lebanon, each group was responsible for its own donations, which it totaled up and worked on separately. Figure 46 depicts the activities taken in both nations to address the key post-crisis management issues.

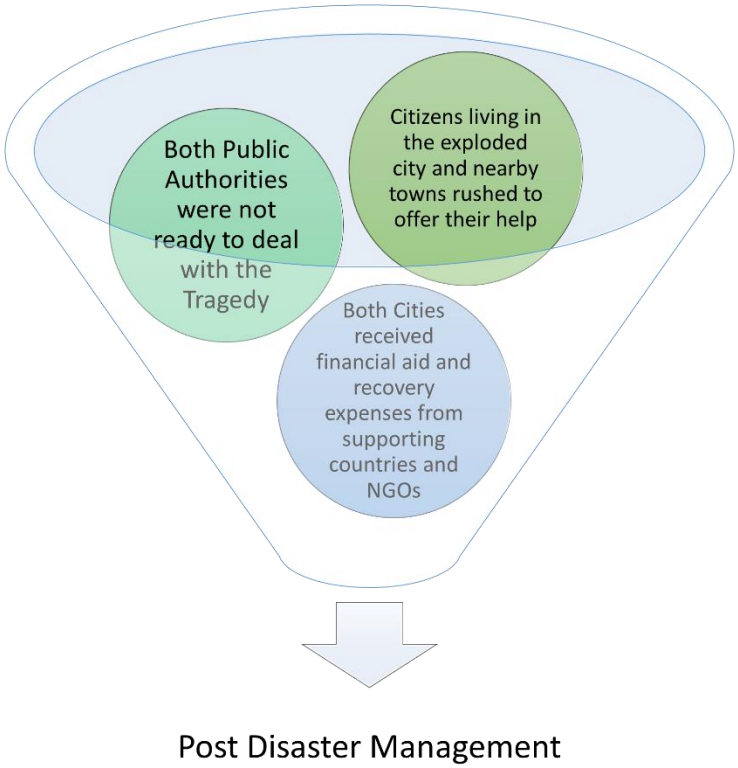

Figure 46 Comparison of post disaster management - Graphics managed by author

The contrasts:

Although the government was first unprepared to deal with the catastrophe, it subsequently rose to the occasion by appointing English urban designer Thomas Adams to develop a new urban rehabilitation plan for the city. Thomas Adams began work on his idea, which he would later offer to the Halifax Relief Commission and the Federal government. Thomas Adam's proposal was similar to Hiroshima's in that it recommended lowering building density and increasing green and open space. With the funds raised, they were able to design, repair, and better regenerate Halifax's urbanism while keeping the tragedy's memorial character, much like Hiroshima. The issue now is whether Lebanon did the same to Beirut. Quite simply, no. Beirut is still covered in ashes and bricks, the explosion has been forgotten, and life has gone on as usual. The administration is still preoccupied with its own issues, rather than redeveloping a better urban port for the country. They discovered the simplest solution, which was to alternate the port cargoes between Sidon and Tripoli.

8.4 Beirut and Toulouse

The explosion in Toulouse, France, caused similar damage to the disaster in Beirut, but it was on a much lesser scale. The overall number of deaths is the only component that is much higher in Beirut (218) than in Toulouse (20), despite the fact that the total number of injured individuals is nearly same, as shown in table 4. In Toulouse, 2,442 people were hurt, while in Beirut, 2,000 people were injured. The French people had minor medical issues including post-traumatic stress and social disturbances, but the Lebanese people were seriously affected, with lung damage, eye and eardrum ruptures, and significant brain traumas. The reason for this is that the fertilizer plant in Toulouse was located a little far from the residential area, and the plant employees were the ones who were seriously injured, whereas in Beirut, as I previously stated, the Beirut port is located in the heart of the city, next to the Downtown, residential towers, and commercial activities, where people are more likely to be present. The fertilizer factory exploded, causing a financial loss of roughly 2 billion euros, but in Beirut, the residential, commercial, and port facilities and functions were damaged, resulting in a financial loss of up to 4.6 billion dollars. Because Beirut is the country's capital, there are many schools and healthcare facilities, and their excess has resulted in the destruction of 113 public and private schools.

Table 4 *Damage Severity Comparison - Graphics managed by author*

DAMAGE SEVERITY		
INDEX	Toulouse, France (40 tons TNT)	Beirut, Lebanon (300-400 tons TNT)
Total deaths	21	218
Total Injuries	2,442	2,000
Post explosion Medical Inquiries	Post Traumatic stress – Social disturbance	Lung Damage – Eye/Eardrum ruptures – Brain Injuries
Total buildings damaged	27,000	10,000
Total Schools Damaged	82	113
Estimated Financial Loss	2€ Billion	3.8$ – 4.6$ Billion

Without relying on NGOs, the French government remained firm and confronted the disaster head-on. Due to the post-explosion stress, the government was able to offer the essential shelter and medication for the afflicted inhabitants, to the

point where they also placed certified psychologists for the citizens. It is evident how much the government valued the lives and health of its inhabitants. Unfortunately, unlike in Beirut, where people died on the streets owing to overcrowding in hospitals, dying people in operating rooms due to power outages, and rendering people homeless due to the government's disregard for the goal of providing temporary accommodation. Not only that, but the French government also suggested a strategic urban plan that would divide the zoning of industrial and residential neighborhoods in the future to avoid a repeat of the disaster.

8.5 The World Bank Policies

The World Bank performed a study to determine what policies are required to restore a viable Beirut port following the explosion. They began by putting in place the essential guiding principles that Lebanon lacked in terms of frameworks and foundations. According to their findings, the main 4 blocks, or 4 main pillars, that are required to realize their plan are a new governance structure for the port, efficient processes, open and transparent bidding, and quality infrastructure, all of which have been lacking in Lebanon for many years following the civil war.

They recommended reconstructing the Beirut urban port and changing it into a Digitized port, citing its strategic location and importance as one of the most significant ports connecting numerous cities in the Middle East.

The phrase "digitized" is not as straightforward as it may appear. According to the World Bank, Beirut must have frameworks, linkages, and, most significantly, political equality and transparency in its administration in order to become a digital port.

According to them, Lebanon needs to build a simple IT infrastructure, and in order to do so, the Lebanese government will need to reform the appropriate legal, institutional, and operational procedures. A new management approach, on the other hand, must be led by a strong political commitment, which has also been absent at a high level in Lebanon. The most important and first digitized ports, according to the findings of this study, were in Rotterdam, Netherlands, and Quebec, Canada. The two nations have strong infrastructures and a single-handedly powerful administration, which has aided in the digitization of their ports. All of the basic policies introduced by the World Bank are excluded in Lebanon.

The author used a basic comparison to highlight the differences and similarities in particular infrastructure between Lebanon, the Netherlands, and Canada for Digitizing the Ports:

As shown in Table 5, the technologies required for the smart port, such as big data, artificial intelligence, Internet of Things, and blockchain, are not yet available in Lebanon, with the exception of the 5G network, which is only available in a few districts due to Lebanon's poor connection lines. Big Data companies are available in Lebanon as private firms, but governmental institutions, especially the Port of Beirut, are not responsive to this inquiry.

Countries like Rotterdam and Quebec, which were able to digitize their ports in the first instance, are equipped with the ideal technology for this port to work as intended.

Table 5 *Technologies comparison for smart port - Graphics managed by author*

TECHNOLOGIES NEEDED TO ACHIEVE A SMART/DIGITIZED PORT			
INDEX	ROTTERDAM, NETHERLANDS	QUEBEC, CANADA	BEIRUT, LEBANON
BIG DATA	AVAILABLE	AVAILABLE	N.A
ARTIFICIAL INTELLIGENCE	AVAILABLE	AVAILABLE	N.A
INTERNET OF THINGS	AVAILABLE	AVAILABLE	N.A
BLOCKCHAIN TECHNOLOGY	AVAILABLE	AVAILABLE	N.A
5G NETWORK	AVAILABLE	AVAILABLE	AVAILABLE

9. Conclusion

The procedures of urban redevelopment and Beirut port reconstruction are complicated, according to prior results. The fundamental issue in Lebanon is the partition of the government in order to represent various religions. When difficulties develop in Lebanon, each religious group protects its own government officials without holding them accountable for their corruption and negligence, instead blaming other religious groups' leaders and representatives. This has not only allowed corruption to grow, but it has also contributed to the division and sectarianism that have grown so prevalent in Lebanese society. While government corruption is an issue in

and of itself, it has also had bad economic consequences; it has been said that it is the fundamental reason of Lebanon's economic downturn. In 2018, Lebanon's economic growth was only 0.2 percent, with a 30 percent unemployment rate for youth, and as a result of these conditions, citizens of Lebanon have become increasingly critical of the quality of life in Lebanon. While government corruption is to blame for Lebanon's dire situation, the coronavirus has simply added to the problem. There have been multiple lockdowns in Lebanon since the first epidemic, all of which have had a severe impact on the economy. The most devastating effect has been the devaluation of the Lebanese Pound, which had already lost a significant portion of its value prior to the pandemic but has now lost almost 75% of its value. On August 4, 2,750 tons of explosive material unlawfully stored at Beirut's port exploded, erasing the port and its suburbs. The reason of the explosion has remained unknown until now, but it has subsequently been revealed that the government was told about the material about six years ago and was even warned by security personnel to remove it a few weeks before the disaster. The fact that the government first stored 2,750 tons of explosive material near a residential area and ignored warnings to confiscate this material for years demonstrates the government's level of indifference to its residents and country. Lebanon has been on the verge of catastrophic collapse due to government corruption and indifference. The people of Lebanon have grown increasingly convinced that the government is unconcerned about their safety or livelihood as the country spirals deeper into political, social, and economic chaos.

On the other hand, even though the World Bank's proposal is unique, and we all want such an advanced and technological Smart or Digitized port, Lebanon requires a number of infrastructure improvements, or, to put it another way, an infrastructural renewal plan, in order to provide this Digitized port with the necessary technology. We must also examine the country's abundant full-time electricity, which is regarded as a significant hindrance to any digitized strategy presented for Lebanon. On the other side, the country has faced several economic and budgetary difficulties and limits as a result of subsequent catastrophes such as the revolution, the Covid 19 pandemic, and, finally, the Beirut bombing. As a result, the government is unable to fund new rehabilitation or reconstruction projects.

Lebanon is clearly unable to afford any reconstruction proposal. The United Nations Development Programme (UNDP) and a number of other non-

governmental organizations (NGOs) had a significant impact on disaster recovery and reconstruction. Due to trust concerns with the Lebanese government, Lebanon has received many international aid and donations that were quickly distributed to NGOs. Germany and several other countries have offered to the Lebanese government a multibillion-dollar rehabilitation and redevelopment plan for the Beirut port based on one condition: gaining the Lebanese government's trust and demonstrating complete transparency. The author adopted two sorts of policies to reconstruct Beirut in this case: **International and Local Policies**.

9.1 International Policies for Rebuilding Beirut

1. Creating an **Urban Agency** that hosts local and international experts and classify it as Semi-public agency.

Figure 47 Urban Agency Formation Diagram - Graphics Managed by Author

Figure 47 depicts the establishment of a physical Urban Agency, which will be home to both national and international experts, including planners, engineers, and architects, who will be able to contribute their expertise to the redevelopment

of the Beirut port in coordination with the Order of Engineers and Architects in Lebanon. Foreign countries are eager to assist Lebanon in redeveloping the Beirut Urban port; all they ask in return is for complete transparency from the Lebanese government in order for them to sponsor the proposals. This Urban Agency is a more efficient and reliable replacement that can manage the action plan.

2. Reconsidering the committee members Superior Council of Urbanism (**CSU**) in the General Directive of Urbanism (**DGU**) to ensure fully trusted decisions.
3. Creating a new **Port authority** and appoint a board of directors in a transparent way based on professional qualifications, with clearly defined tasks and accountability.
4. Creating and Reactivating the **Ministry of Planning** to handle and control the redevelopment process

Because Lebanon has received numerous international bids, the only thing stopping these countries from investing in Lebanon is the government's financial crisis and corruption. Obviously, Lebanon will not be able to fund the initiatives on its own, thus the best option and only condition is for the government to demonstrate complete transparency and end deadlocks between political parties and Lebanese representatives.

9.2 Local Policies for Rebuilding Beirut

Beirut Port Urban Planning:

1. Assessing the Port of Beirut's new role as a vital commercial facility, considering other ports on the Lebanese coast as well as other ports on the Mediterranean's eastern coast.
2. Re-establishing a connection between the port and the city center, as well as repairing the port's contact with the impacted areas.
3. Replanning the Port’s location and functionality of basins by transforming some basins into green areas and linking them with the waterfront.
4. Designing a memorial to honor the victims of the Beirut Blast and serve disaster survival remembrance.

5. **Encouraging the citizens** and fresh graduates to participate in the reconstruction and redevelopment urban planning process of Beirut port through workshops and conferences
6. Examining the master plan for the Port of Beirut in light of the national strategy's guidelines and principles to optimize the number, size, and location of facilities; reduce urban traffic around the port; and improve operational efficiencies and hazardous products handling.
7. Conducting extensive contamination evaluations at the explosion site and responding to immediate demands, such as site clearance, silo dismantle, rubble removal, dredging, vessel removal, and trash disposal (including grains and hazardous waste).

Urban Heritage:

1. Concerning the heritage character of the affected areas, which consists of its general fabric and component units of this fabric, as a single project entity to fully preserve its diversity, which expresses the stages and developments that have passed through the city, and to treat the site as an integrated civil and social fabric.
2. Using the Urban Heritage Fabric to meet the demands and requirements of the social fabric, as well as the changing needs and roles of the social fabric.
3. Considering parts of the Urban Heritage Fabric as special areas subject to plans and legislation that apply to the entire tissue and area, rather than classifying them as single structures.

Collaborative Platform:

1. Developing a housing and urban recovery strategy by establishing a city-wide, multi-stakeholder platform; specify organization and implementation strategies.
2. Establishing a platform for collaboration amongst stakeholders and NGOs to share information about the reconstruction zones and cooperate

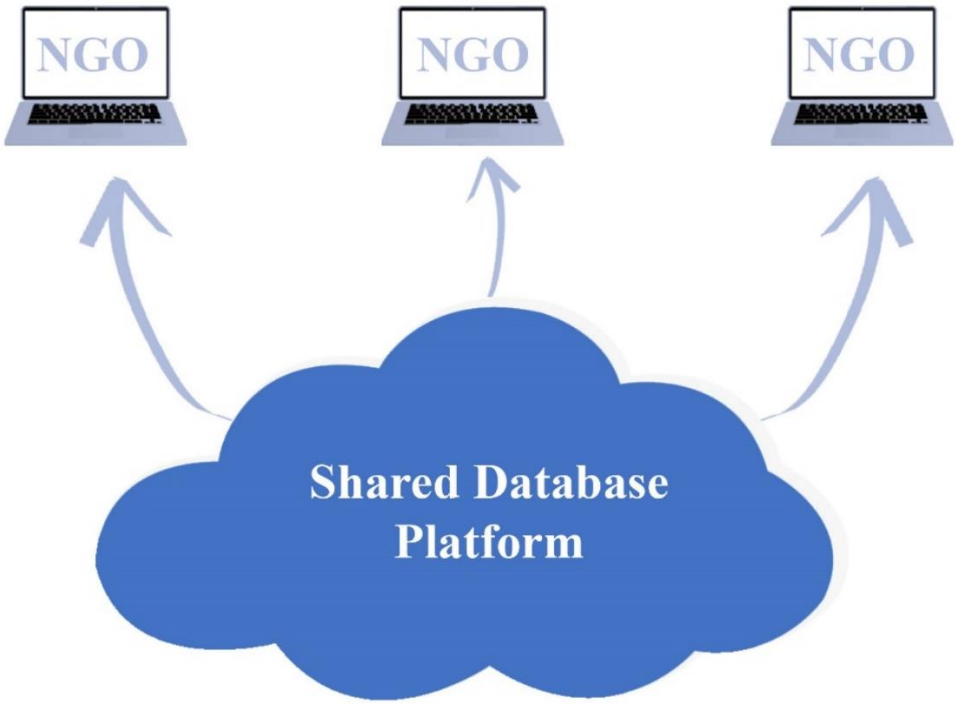

Figure 48 Shared Data Platform for stakeholders and NGOs - Graphics managed by Author

Returning to the research hypothesis at the end of this study we can draw the following conclusions:

First, the Lebanese government is incapable to rebuilding the Beirut port on its own because the method is primarily financial in nature, and Lebanon's government has been plagued by corruption and inflation, rendering it monetarily bankrupt.

Second, the government must change and obtain complete openness in order for other countries to assist and invest.

Third, the government must construct its own robust infrastructure in order to be capable of dealing with foreign proposals.

In light of the facts, it is obvious that the Order of Engineers and Architects made numerous ideas and action plans for the Beirut port, both internationally and locally. In Lebanon, non-governmental groups and private institutions did their best to assist in the reconstruction of destroyed buildings and the relief of victims of the Beirut explosion. They also assisted in the development of action plans and

recommendations for repairing and redeveloping the Beirut urban port and damaged districts while maintaining the city's heritage and identity.

The port requires a large budget, which the government does not have now or in the future, and the only way to finance it is with the help of other nations, who have already proposed, but with official rules, that the Lebanese government earn their trust.

Apart from foreign assistance, budgetary conditions, and government transparency, the author implemented several local policies that could be developed in order to achieve the action plan and regulate the country's economy while also providing the trust and transparency that foreign countries seek by establishing a semi-public Urban Agency staffed by international and local experts and funded by contributing countries and stakeholders. On the other hand, the creation of a common data platform is required to deliver the necessary information to the NGOs and organizations involved in Beirut reconstruction, allowing them to work together rather than independently, speeding and facilitating the process.

As a result of the port explosion, the author implemented policies that review a collection of ideas that would serve as a starting point for work in order to formulate an integrated vision for the rehabilitation of the impacted areas. As a result of the unfortunate incident, it provides a national vision for reconstruction, historical restoration, social fabric preservation, and distinctive urban character in the afflicted area, as well as a reformulation of the port connection and its urban surroundings.

Although it has been two years since the Beirut blast and no action plan has been implemented, now is the finest moment to plan and create the ideal urban model for Beirut, which is considered a divided city with no connection or linkage as each district serves itself. It's unfortunate to say, but now that Lebanon has talented architects and engineers who have been through a variety of challenges, there is a great opportunity to create the perfect urban model, and the time is now to make the best decisions that will ensure Beirut's urbanism remains the perfect model for the future.

Following the explosion, the port of Beirut has undergone numerous studies and ideas aimed at transforming the site into a port, a touristic waterfront, and green open spaces connected to the city center and nearby neighborhoods such as Karantina and Mar Mikhael. It is the best opportunity to create a self-sustaining and self-maintained urban model for the damaged city, ensuring high economic incomes to balance the country's financial losses and strengthen it, as the Beirut

port is strategically located and considered one of the Mediterranean's well-connected ports.

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